PROJECTIONIST

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NOVEMBER 1952

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AARON NADELL, *Editor*

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MONTHLY CHAT

THREE months ago the International Alliance held its 41st Convention in Minneapolis. This month no less than three other industry organizations convene, in Chicago. These are the Allied States Association of Motion Picture Exhibitors, the Theatre Equipment and Supply Manufacturers Association, and the Theatre Equipment Dealers Association. They are holding a triple convention and joint equipment exhibition.

These friendly gatherings of competitors, rivals and opponents are increasingly typical of American industries. At Minneapolis last August the IA invited to its rostrum and microphone outstanding representatives of those employers with whom on other occasions IA officials negotiate to the last inch. Some of these employers and employer representatives, who felt they had a message, came of their own accord without invitation to the IA Convention and were freely invited in and handed the microphone in all cordiality.

This month in Chicago othertime rivals, determined competitors for the favor of the theatreman and the projectionist, will meet at the same cocktail party and banquet, dance with each other's ladies, and in general comport themselves as members of an industry inside of which differences and quarrels are all in the family.

Behind the organizations that make such gatherings possible there is always a man, or at most a few men, who do the work. Behind the Theatre Equipment and Supply Manufacturers Association (TESMA) there is, and has been since 1945, Roy Boomer, who serves as continuous secretary while elected presidents come and go; who organizes, oversees, fosters, pushes and drives at a thousand separate points until at last all the wheels run in harmony. Behind the Theatre Equipment Dealers Association (TEDA) is its executive secretary, Ray Colvin.

At these joint trade shows (TESMA and TEDA have been meeting jointly since 1946) substantially all manufacturers of theatre equipment, including projection room equipment, put on exhibition their best and latest models, with their senior salesmen in attendance. Hundreds of projectionists, as well as theatre owners and managers, stroll the aisles, examine the apparatus displayed, ask questions, collect literature. Always a few of the smaller exhibit booths are occupied by working projectionists who have invented some device or improvement and show it at these gatherings in expectation of finding buyers or arousing interest.

IP readers who will be in or near Chicago November 15th to 19th will find almost the whole of their industry on display at the Morrison Hotel; the latest equipment and apparatus for the theatre spread out for their inspection with experts on hand to explain it; and some hundreds of their fellow craftsmen crowding the aisles. We advise those who can, to go.

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VOLUME XXVII NOVEMBER 1952 NUMBER 11

Safety Film: Performance Characteristics

PART II

By ROBERT A. MITCHELL

It is an evident fact that safety film theatre release prints are here to stay, come what may, and it is in the best traditions of the projectionist craft that it use this film stock so as to achieve the best possible picture quality on the screen. This is no more and no less than an enlightened, an alert and intelligent self-interest.

WHAT about splicing? Many projectionists interviewed by the writer within recent months still would rather make half a dozen nitrate splices than one safety splice. In some cases I really believe that the trouble was psychological—if the projectionist had been unaware of the fact that he was splicing a different kind of film with a different kind of film cement, he would have experienced no difficulties at all. This is not to say that difficulties in splicing safety film are purely imaginary, for that would not be true.

Some projectionists are inclined to hoard film cement as though it were liquid from the fountain of youth. That's bad for two reasons. First, nearly all cements deteriorate with age, as air, moisture, and dirt get at them. Second, some of the earlier safety and "double-purpose" film cements actually weren't much good anyway. They worked with nitrate film, but were not very effective when applied to safety film. So keep in mind that within the past few years a number of changes have been made in the film-cement field. Ever hear about Film-Weld, Ethvloid, and Jefrona all-purpose cements? They are advertised in IP. Why not give them a try?

Splicing Problems

If the cement you are using takes too long to "set" the splice, or demands scraping even the blank side of the film, or gives a weak splice with safety film—then change your brand in a hurry! Some well-known brands are very slow-acting and yield splices of uncertain strength. Moreover, some are too thin in consistency to permit application of an adequate quantity *on the scraped stub where the cement is needed.*

The splicing of safety film has been discussed by various writers numberless times. Truth to tell, some of this advice sounds rather academic, and we wonder if it actually originated from practising projectionists. Our time is limited; and there are times when we cannot give each and every splice the same degree of attention demanded of a jeweller assigned to study and split a diamond. It's simply a question of how much time we can afford to devote to the repair of prints and the making up of "coming attractions" prevue stuff.

Some exhibitors have apparently never heard of the Emancipation Proclamation, and some of the ivory-tower boys just don't know what practical theatre projection is. With close shipping and shows starting at 2 p.m. or earlier, the average projectionist has good reason to dread a change of bill, especially when the exchanges have passed *their* undone work along to *him.*

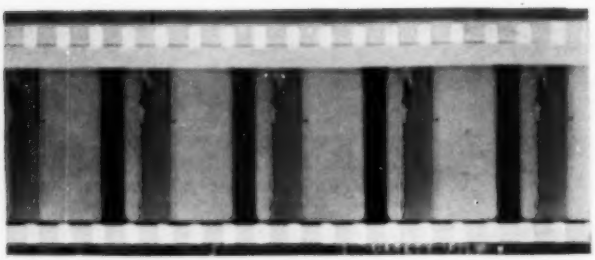
Splicing really begins with the identification of the film stock unless a *good* double-purpose safety-film cement is used. Such cements exist, and we are thankful to them for making it unnecessary to find out whether the film is nitrate, acetate, or a mixture of both. But to those projectionists who insist upon using nitrate cement for nitrate film and double-purpose cement (most brands of safety-film cement) for safety film alone, the problem of correctly identifying the type of film-base is very important.

Nitrate film is identified by the words NITRATE FILM printed at intervals along the edges, by lateral dashes printed as frame guides on the outer margins of the film, and by high inflammability. But since anything can be printed through to the release positive—manufacturers' identifications, footage numbers, print letters, and also the words NITRATE FILM and SAFETY FILM—anything at all from original negatives, master positives, and duplicate negatives—the only infallible proof of the nature of the base is to touch a lighted match to a clip from the print. If it burns like fury, it's nitrate. Or at least, the clip was.

Safety film is identified by the words SAFETY FILM or simply SAFETY at intervals along the edges. But, here again, these words may be print-throughs *onto nitrate stock.* So don't believe everything you read.

Double Check for Safety

Safety film of Eastman manufacture is framed-marked by longitudinal dashes between every fourth sprocket-hole. But don't trust these, either. I have before me on this desk samples of prints containing several varieties of dots and dashes, including squares, triangles and various other geometric hieroglyphs printed between the sprocket-holes. So try the flame test. If the film burns like paper, or merely melts and sizzles, it's safety film. Or at least that part of the print from which the clipping was taken was safety film. *As a matter of fact, the use of nitrate along with safety film can be extremely dangerous if the projec-*



A print on nitrate stock showing conflicting identifications printed through from a safety master positive and a safety duplicating negative.

tionist relaxes his vigil against the fire hazard.

For checking large reels made up of *Eastman Kodak film only*, the fluorescence test may be used. Eastman has introduced tiny amounts of normally invisible (clear) fluorescent materials into its safety base. When irradiated with "black light" (ultraviolet radiation with all visible wavelengths filtered out), Eastman high-acetyl safety film glows bright purple, whereas nitrate film appears black by comparison.

However, we also have Du Pont safety film to reckon with (which at present is similar to the Eastman high-acetyl film in this respect), and likewise Ansco Color safety base. In addition, large quantities of the Belgian Gevaert high-acetyl safety film seem to be floating about, and this is not always fluorescent. The German Agfa film, once a great favorite in this country because of its consistently high physical and photographic quality, is now almost exclusively a behind-the-iron-curtain product; so we need not worry about that except in very old prints.

The actual splicing of high-acetyl safety film is a simple matter when good cements are used. The only trouble is that it takes about twice as long for a safety splice to "set" solidly than it does for a nitrate splice. This is because high-acetyl base, practically the triacetate of cellulose, is very resistant to solvent liquids. Only a limited number of solvents attack it readily; and most of these are too poisonous to be used in the projection room. The projectionist not only breathes the fumes, but he usually gets a bit of the stuff on his fingers, where cuts and minor abrasions assist the absorption of poisonous chemicals into the bloodstream. So the bad actors in the chemical family don't get into film-cement bottles.

Scraping the Splice

Proper scraping, however, assists the "setting." After scraping the stub in the usual manner, roughen the surface of the base, just as most projectionists have always done with nitrate film. Emery cloth of the finest grade may be used; and if the splice is afterward brushed with a clean piece of cloth, there isn't much danger of gritty particles getting into the projector. Some projectionists prefer razor blades; and this writer swears by a piece of beryllium copper ground to a razor-sharp edge.

Now, just what is the reason for roughening the stub? It increases the surface area enormously, providing more exposed base for the film-cement to act upon.

Most projectionists don't need this advice; but here we go again. Apply the cement you are using with one or two strokes of the brush—no more. Clamp and allow about 10 seconds for the splice to set. (Only 5 seconds are needed for nitrate film spliced with regular nitrate cement.) And if the splices seem to be especially slow in setting on certain chilly days, first warm up the splicing gadget on a hot radiator or with an electric heating unit (but remove the splicer from the rewind bench to do this).

Film Cements

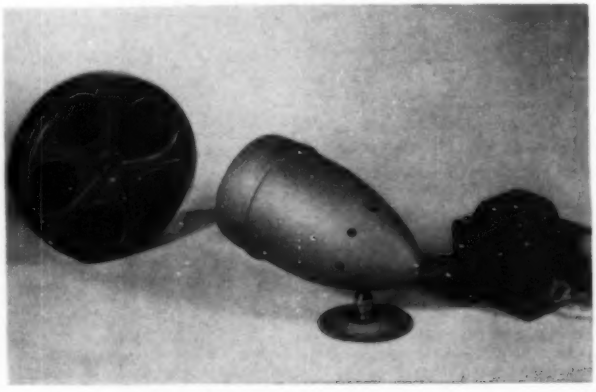
This brings us up to the film-cement itself. What's it made of? How does it act on the film? To answer the last question first, a film-cement is merely a solvent which *dissolves* the film base. It acts upon the surfaces of the stubs and *welds* them together. It is not a glue. The film-base material itself is the glue. In practice, however, the solvent liquid (which may be composed of several solvent chemicals mixed together) may be thickened by dissolving a little of the proper film-base material in it—nitrate base in the case of nitrate film-cement, safety base in the case of safety film-cement, and safety base with a trace of nitrate base in an effective "double-purpose" film-cement.

Projectionists do not like a "thin" cement. If the cement is too watery, it does not remain on the stub where it has been applied, but runs off the edges of the film, or creeps underneath the film-holders to soften the film exactly where we don't want it softened. A syrupy consistency works best because the cement then sticks to the stub where applied and does not "soak up" half a frame of film. If *too* thick, however, the cement may not penetrate the stubs sufficiently to give a good weld.

High-acetyl Cements

High-acetyl safety-film cement is but a trifle more complicated in practice than nitrate cement because, while there are many simple and inexpensive solvents for nitrate base, only a few work well with high-acetyl base—and some of these are rather weird. In fact, a descriptive list of feasible triacetate solvents makes mighty short and dismal reading.

First, however, let's consider two very good solvents for nitrate base, *i.e.* banana oil and acetone. Banana oil (amyl acetate) has little or no effect on high-acetyl base. This chemical, therefore, should not be used in any cement intended for safety film. Acetone, even though failing to dissolve large quantities of safety base, softens it sufficiently to give weak to moderately strong safety splices. But splices made with pure acetone buckle so badly



An ultra-violet lamp used for examining a roll of film to determine whether it is on fluorescent-treated safety base. (Photographed with white light.)

and are so uncertain in strength as to be unfit for running through a projection machine.

The best practical solvent for high-acetyl base is a watery liquid called dioxane. Some scientists, especially in Europe, are inclined to regard dioxane as being too toxic to be slopped about in any except well-ventilated rooms. Film manufacturers, while agreeing that dioxane is mean stuff, pooh-pooh the notion that its use will harm projectionists. And the film manufacturers are probably right.

Dioxane has what is called by biochemists and pharmacologists a "low-grade" toxicity. It is probably less poisonous than wood (methyl) alcohol, carbon tetrachloride, and other toxic materials projectionists occasionally work with. Since most commercial safety-film cements contain dioxane (or ought to contain dioxane if they are to work properly), breathing the vapor of it and getting some on one's fingers is unavoidable. But so far not one case of dioxane poisoning has turned up in the theatre field.

Because dioxane has a rather high boiling-point (and also because it is somewhat expensive) more volatile solvents are mixed with it, reducing the dioxane-content down to about 50%, making a cement that is more rapid in action (and also lower in cost). These more volatile solvents may be, and ordinarily are, only partial solvents for cellulose triacetate, but in combination with dioxane they work excellently.

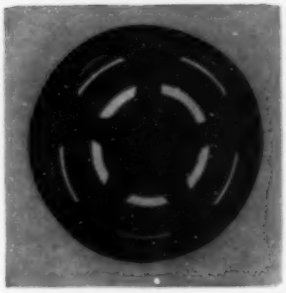
There are also *combinations* (rather than mixtures) of other solvents and partial solvents that may be incorporated into good safety-film cements.

High-acetyl base is quite soluble in chloroform. But for some strange reason, a splice made with pure chloroform is rather weak unless made under great pressure. Chloroform is, like dioxane, a poison; but we have never heard of anyone being poisoned by using film-cements containing it.

Amyl acetate, discussed just a moment ago, is an ester of amyl alcohol and acetic acid. There are many other liquids belonging to the class of simple esters; but the only common one that exerts an appreciable solvent action upon high-acetyl base is methyl acetate. This can be used as one of the ingredients of a film cement containing dioxane or other solvents.

The use of glacial acetic acid commends itself only when no regular safety-film cement is available. It sets quickly to form a moderately strong flat splice with high-acetyl safety film. It should *never* be considered as a satisfactory substitute for the best commercial cements, however. Its action can be improved by mixing other chemicals with it.

The highest cellulose acetate, the triacetate, is slowly soluble in cold glacial acetic acid, but rapidly soluble in the hot



This illustration shows a mixed roll of fluorescent-treated safety film (white) and untreated nitrate film (dark) on an exchange reel. (Photographed with an ultra-violet source.) The edge of the treated safety film is actually colored purple and the nitrate film black in ultra-violet light.

acid. At room temperatures the solvent action of glacial acetic acid for safety base is increased to an appreciable extent when certain other solvent liquids are mixed with it. Just as nitrate base is unaffected by either alcohol or ether alone, but is dissolved by a *mixture* of alcohol and ether, so high-acetyl safety base dissolves to a satisfactory degree in an acid splicing mixture such as glacial acetic acid, plus choloroform, plus acetone.

However, formulae that work extremely well with high-acetyl safety film are not always to be trusted with nitrate film. Chloroform, for example, has no effect at all on nitrate base.

The wearing quality of safety film seems to be a big bone of contention. A typical complaint runs somewhat like this:

Durability of Safety Film

"Take a look at this print. It's a fairly late release, and not a scratch on it; but the sprocket-holes are already badly cracked at the corners. It wasn't that way when we had nitrate prints. A nitrate film has to be practically run to death before perforation damage begins to show up."

Other complaints even involve contradictions. For example:

"Safety film is simply a manufacturer's scheme to make more money. Because it wears out more quickly than nitrate film, the distributor must order a greater number of prints of each picture. That means greater raw-stock sales."

That is one fellow's opinion. Another projectionist says:

"Safety film wears out before distributors can get a reasonable number of runs out of it. Instead of ordering more prints of each picture, the exchanges start bicycling prints to avoid repairing the worn-out prints themselves."

The writer cannot accept paradox as paradox any more than the reader can.

(*Continued on page 27*)

Underwriters' Bulletin on Cellulose Acetate Film

As a pendant to Robert A. Mitchell's discussion of nitrocellulose and cellulose acetate stock in this issue, IP here adds excerpts from National Board of Underwriters' "Special Interest Bulletin No. 283—Film, Motion Picture Cellulose Acetate." The repeated insistence, in this Bulletin, upon the importance of continuing to observe all customary safety precautions as long as nitrate film continues to circulate is particularly important to IP's readers.

FOLLOWING an extended investigation, acetate base film in the form of ribbon for motion pictures was listed by Underwriters' Laboratories Inc. as slow-burning, the fire hazard being classed as somewhat less than that of common newsprint paper in the same form and quantity. Motion picture safety film having a cellulose acetate base is now being marketed for commercial and general use. It is claimed that this film has a greater projection life and is otherwise superior as compared to the older type of cellulose acetate film.

This type of film may be identified by the words "Safety Film" printed at frequent intervals along the edge. In case of doubt, acetate film may be distinguished from nitrate by a burning test, using only a small piece of film, and burning it in a room where there is no film and no fire hazard. Nitrate film will burn fiercely; acetate film will burn quietly.

The ignition temperature of cellulose acetate is between 700 and 800° F., as compared to about 300° F., for cellulose nitrate. A temperature of about 500° F. is required to produce the decomposition of cellulose acetate film. In the neighborhood of this temperature the evolution of fumes in material quantity occurs. These fumes are irritating and suffocating, but not considered to be toxic under most conditions.

The decomposition of cellulose acetate film once started does not continue except under conditions where there is an external source of heat. On the contrary, in the case of cellulose nitrate film the decomposition continues when once started, even in the absence of external source of heat. This difference of decomposition is, therefore, of great im-

(*Continued on page 34*)

Theatre Tv, Stereo, Promise More Jobs

More equipment of diversified kinds, added to the projection room to create the new entertainment, will require more men to operate and maintain it, perhaps as many as six projectionists to a shift, and may lead to specialization in diverse projection skills. Willingness of the public to pay for this depends on the attractiveness of the resulting entertainment (they pay $2.80 now for Cinerama); ability to pay for it depends on the national prosperity.

By LEROY CHADBOURNE

THEATRE television is not "coming" but here; nearly a hundred American theatres have it installed. Cinerama is playing two-a-day to packed houses as this is written. Next month IP will report the audience reaction to polaroid-spectacle feature presentations about to be opened in two West Coast theatres.

Meanwhile, the opposition has a powerful counter-attack in readiness. The television industry has been more or less content to date to wrangle over the kind of color system to use for home receivers. As long as substantial regions of the country remained without telecasts, and continued to provide new markets for receivers as they were added to the net one by one, the Tv industry was reasonably happy. But that happiness is running out fast. Tv manufacturers will very soon face two alternatives: they must either make the American home a-two-Tv home by selling black-and-white receivers at drastically lower prices, or agree on some system of color and start selling color receivers at pleasantly higher ones. Whichever they decide, the theatre can look forward to another box office slump because the customers will use their movie money to meet the Tv installments.

Counter-weapons readily available include theatre Tv, theatre color Tv, stereocinema, Cinerama, stereosound.

Which of these, or what combination of several of them, will prove most successful on trial, only experiment can tell; but how each of them can be expected to affect the projection room and the projectionist is much less obscure.

More Projectionists Needed

For example, there can be no reasonable doubt that projection rooms will have to be enlarged (to accomodate additional apparatus) and very little doubt that a larger number of projectionists will be needed to take care of the additional work. Cinerama, for example, uses three separate projection rooms. Film-intermediate theatre Tv needs a photographic-and-developing space in addition to a projection room. Needs of stereocinema depend in part on the system used, but the most effective method calls for four projectors instead of two. Stereosound as currently known calls for two additional amplifying channels, an additional film carrying soundtracks only, and an additional soundhead for playing that film.

If not merely one, but two or three, of these innovations are added to the same theatre, and used alternately, in order to provide a variety of strong box office appeals, a projection room might conceivably be equipped with four mechanisms, for stereocinema; a fifth (soundhead only) for stereosound; and have a photographic-and-developing room adjoining for film-intermediate Tv—plus possibly still other features. It is only reasonable to anticipate that additions to the previous projection staff will be needed in proportion; and not only for operation but also for competent maintenance of so large an investment in machinery.

Specialization in Skills

Increase in the size of the projection staff, and growing diversity of projection room equipment, must inevitably lead to increasing specialization—and this trend undoubtedly will extend even to the servicing companies. No man can be an expert in many things. Diversity implies specialization. Even today a servicing company inspector who runs into an unusually obstinate trouble may call in a colleague to help him; in the near future the visiting **service inspector** may correspond to a general practitioner, whose business it will be to administer routine medication and to determine when the condition is one that calls for a specialist.

Among the members of an enlarged projection staff specialization can be expected to appear naturally and spontaneously. If one man has an inherent preference for the mechanics of the projector head and another for the electronics of the Tv circuits each will gravitate toward the work he does best and other members of the projection staff will tend to pass on that particular work to him.

Manpower Requirements

Enlarged projection staffs exist now, and have for years, in the great metropolitan theatres. There can be found, and could be found these many years past, competent all-around projectionists who in addition are especially competent in some one phase of projection. Where such specialized competence is outstanding its possessor, by general consent, undertakes such work and collects the overtime when a need for his particular talent appears.

If and as theatre Tv, stereoprojection, and other new box office magnets come into wide-spread use, the enlarged projection staffs and specialized competences now found only in large metropolitan theatres may become general practice throughout the country—at least the trend and pressures will be in that direction.

Specific requirements of each of these possible or probable innovations, such as theatre Tv, stereoprojection, etc., are now known in considerable detail and can be outlined with reasonable accuracy. Factors not yet decided, however, or not at the moment reducible to figures, include among others: the supply of competent manpower available; the manpower staffing policies to be advocated in the future by the IA and determined by process of bargaining; and above all the economics of theatre budgets, which in turn involves the basic question of how much the public will be willing to pay to be entertained by these new mechanisms. Despite these latter uncertainties definite and inflexible factors none the less remain, such as the fact that one man cannot be in two places at the same time, and therefore the recently-developed entertainment machinery is going to require the services of a minimum personnel or else cannot be used. Theatre Tv, stereoprojection, Cinerama and stereosound each impose, in

Dr. Goldsmith to Advise RKO

Dr. Alfred N. Goldsmith, pioneer radio and talking picture engineer and "elder statesman" of this industry, has been retained as technical consultant-adviser by RKO Theatres. He will study and recommend "such measures as will increase the attractiveness of the theatre motion-picture screen to the American public," Dr. Goldsmith tells IP, adding: "I remain of the opinion that well-run and attractive theatres, presenting films of high quality, are a permanent and profitable portion of American life. A variety of types of competitive entertainment is stimulating and it is certainly to be hoped (and believed) that the theatres of America will continue to supply programs which will appeal to, and hold, the attention and support of the public."

Concrete steps toward using all the resources of technology to enhance the attractiveness of theatre screen presentations will constitute Dr. Goldsmith's latest contribution to this industry through this new connection with RKO.

Cauldron boil . . . and kettle bubble . . .

Difficult though they may be, situations like these do come off, thanks to the care with which film and chemicals are keyed to specific photographic situation and production methods, thanks, also, to the rigid control of processing solution strength and temperature.

In this area—in production, distribution, and exhibition, too—representatives of the Eastman Technical Service for Motion Picture Film are proud to serve the industry.

To maintain this service, the Eastman Kodak Company has branches at strategic centers . . . invites inquiry from all members of the industry. Address: Motion Picture Film Department, Eastman Kodak Company, Rochester 4, N. Y. *East Coast Division*, 342 Madison Avenue, New York 17, N. Y. *Midwest Division*, 137 North Wabash Avenue, Chicago 2, Illinois. *West Coast Division*, 6706 Santa Monica Blvd., Hollywood 38, California.

their present state of development, certain unavoidable manpower requirements.

These requirements necessarily extend beyond the theatre to the supply dealer and service company. If there is more equipment in the average projection room the service company either must send more than one man to inspect it or, if one man does it all, grant him a longer period of time per average visit. In either case, the service companies will need enlarged staffs. Since they face this need, owing to the existence of a larger number of items of equipment to be inspected and maintained, they must charge a higher fee. The supply dealer, carrying a more varied inventory, and faced with the same need for increased personnel and increasingly diversified skills as the projection room itself, will not necessarily charge a higher price per item, but he will sell the theatre a larger number of items. He will do more business and need a larger staff accordingly.

Advent of technical innovations in the projection room should therefore increase employment opportunities offered by service companies and supply dealers as well as opportunities in the theatre.

Theatre personnel requirements resulting from installation of new and more varied equipment, considered only from the point of view of known equipment needs and without regard to available manpower, IA policies, or theatre budgets, may be summarized approximately as follows.

Three general types of theatre television equipment exist, with varying requirements as to personnel. These are: direct projection, film-intermediate, and Eidophor.

For Theatre Television

Direct-projection systems as currently installed and used in dozens of projection rooms have been and are operated successfully by standard two-man crews. In a one-man projection room they could not very well be used unless a second man were added, owing to the need for continuous monitoring to maintain image quality and minimize any chance of interruption.

Interruption on Tv (it cannot be stressed too often) is beyond comparison more serious than with film. Film, at worst, can be rethreaded and run again; the entertainment is impaired, but not lost. But the knock-out punch or ninth inning home run a Tv audience misses cannot be shown to them two minutes later—it's lost. And that climax is what they paid to see.

One man must monitor the Tv show at all times and therefore another must be available to rewind, thread up, trim the lamp and otherwise prepare for the film show to follow—unless, in some distant day, the theatre goes all-Tv, which is very nearly impossible, owing to the fantastically large quantities of program material that would be needed.

Film-intermediate Tv involves a separate room (or equivalent floor space) equipped with a Tv receiver, motion picture camera and recorder, frame frequency converter (from 30-frames-per-second to 24-frames-per-second) and developing machine. This equipment needs attendance. The developer solutions must be prepared, loaded and changed. Film must be threaded through the long and highly intricate film path. Operation of all these apparatus items must be supervised and adjusted from time to time as the show proceeds.

Simple maintenance duties, of elementary nature not justifying calling in a service man, must be carried out, and the whole performance of the installation watched by an attendant who is competent to determine when a service inspector's help is needed. None of these functions can be exercised by the regular projection crew because they are and remain at their normal posts in the projection room. One, at a minimum, additional projectionist, will be needed, and much more probably, two.

Eidophor Tv is directly projected, but involves additional apparatus items not found in other direct-projection systems. These include the refrigerator and the vacuum pump. How much attention these will need in routine daily operation only such operation can determine with finality, but as a probability one additional man should be required. The indeterminate factor here lies with the "bugs" that do not show up when one laboratory model is operated under expert engineering supervision, but appear later when a hundred models are working in a hundred theatres under supervision of craftsmen whose abilities are a step below those of an engineer.

Since Eidophor does include, in general, all the equipment items incorporated in other direct projection Tv's, plus some peculiar to itself; and since other direct projection videos require a two-projectionist projection room, Eidophor will need between two and three projectionists—perhaps three at the beginning and two later on after time has eliminated the bugs.

Stereoprojection

Although several systems of stereoprojection are mooted, only the polaroid-spectacle variety will be considered here. A resume of the various proposed meth-

(*Continued on page* 28)

A British Reaction to the RCA Synchroscreen

R. Howard Cricks, technical consultant to *Ideal Kinema* of London, offers in the October 9th issue of that publication this British reaction to the RCA Synchroscreen and his view of its desirability in motion picture theatres.

"A NEW style shop window for the picture" was the description applied by A. Smith Harkness to the RCA "Synchroscreen," which is installed at the Queen's, Bayswater. The screen—the invention of Ben Schlanger—is to be handled in this country, as in America, by RCA, and is to be manufactured by Andrew Smith Harkness, makers of the "Westone" screen.

As previously described, the principle of the Synchroscreen is simply that wings on both sides of the screen, and top and bottom of it, made of the same screen material, are dimly illuminated by re-reflected light from the picture. The picture is thus framed by a border, the intensity and color of which vary synchronously with those of the picture.

The construction is exceedingly simple. Panels are arranged at the correct angles on the sides, top and bottom of the screen. In America, the frames are made of wood, but for this country angle iron has been used.

At a demonstration last month, we saw a couple of reels of an American musical, a Pathé newsreel, and part of "Happy-Go-Lovely." I would naturally not describe the effect as stereoscopic, but it was generally agreed that the picture gained an appearance of depth, particularly when the camera trucked towards the set. In a black-and-white film the effect seemed to be more pronounced than in color.

The effect would be still further enhanced if it could be arranged for the brightness of the surround to fall off towards the outer edges, so vignetting the picture and its surround. But this would ideally necessitate curved panels, although probably the cheaper method of painting the edges of the wings would give a similar effect.

A point I noticed at the start of the demonstration was that as the tabs opened on the screen the whole structure of the surround was revealed by the color-flooding. Flooding should be restricted to the actual screen area—which, of course, would mean that it must be done by spotlights, and not by floats and battens.

To summarize, in my view the "Synchroscreen" would be an asset to any kinema.

One must accept the views of ophthalmologists and lighting engineers that a black surround is conducive to eye-strain. But the chief argument in favor of the new screen is that it is something new in picture presentation and enhances the standard of projection.

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THEATRE EQUIPMENT

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Transistor— Successor to the Vacuum Tube?

Doing much the same work as the amplifier tube and photelectric cell, the transistor now is being produced in quantity and with production line uniformity of operating characteristics. Its use in the theatre may make three-dimensional sound economically feasible for even the smallest house, and in addition eliminate or minimize many present causes of sound trouble.

TRANSISTOR is the name given to a device, first announced in crude form in 1948 but now improved and entering into mass production, that promises to replace the vacuum tube in many applications and do a better job.

Theatre sound equipment built around transistors instead of vacuum tubes should be less subject to trouble, very much more compact, and less expensive. With transistors, the cost and complexity of triple-channel amplification for three-dimensional sound should be substantially reduced. For ordinary sound, the reduced cost and complexity suggest that each projector may have its own amplifier and this arrangement, with emergency changeover switch, could provide every theatre with the protection of a dual amplifying channel.

However, costs for theatre-type equipments are not yet determined at this time of writing; for the present, only probabilities exist.

Since the transistor, unlike the vacuum tube, is not microphonic to mechanical vibration, such amplifiers could readily be mounted on their respective soundheads. Because transistors have no cathodes in the conventional sense and do not develop substantial quantities of heat in operation they, and their associated amplifier components, can be sealed hermetically and so made impervious to lubricating oil.

Transistors can perform most of the functions of vacuum tubes. Specifically, they can function as amplifiers, not only at sound frequencies but also, with suitable circuitry, up to one megacycle per second. They can therefore serve many (although not all) television amplifier requirements. Transistors, like vacuum tubes, can be connected as oscillators, generating alternating current over a wide range of frequencies. The phototransistor is a variety responsive to light, including rapidly fluctuating light, and could conceivably replace the PEC in theatre sound equipment if the magnetic soundtrack does not displace it first.

Use of the transistor in theatre equipment, however, may be delayed because of the many other, more vital, services it can perform in other fields. For many military purposes it is extremely valuable; small size, light weight, absence of surplus heat in operation, absence of an A battery, make the transistor practically ideal for walkie-talkies on the one hand; and on the other, for highly complex electronic installations, where hundreds or thousands of tubes (and their A circuits) can be replaced by an equivalent number of incomparably smaller transistors with no A circuits and no surplus heat to be dissipated.

The transistor also is ideal for hearing aids. For commercial airline electronics, for radar, for portable radios and other applications, the transistor also holds out great promise; and the theatre may have to wait accordingly.

Background of the Transistor

The conventional vacuum tube, it will be remembered, developed out of the two-element or rectifier tube, originally known as the "Fleming valve." After extensive study of the two-element tube and many experiments, de Forest added the grid and so produced the first three-element or amplifying tube.

FIG. 1. One form of transistor. This tiny unit yields an amplification of 100 (20 decibels).

In somewhat the same way the transistor grew out of extensive study of "semi-conductors" and many experiments with them. The new de Forests are John Bardeen, W. H. Brattain and William Shockley of Bell Telephone Laboratories.

Projectionists are familiar with semiconductors and use them daily. The carbon of arc lamp carbons is so very "semi" as a conductor that it is often copper-coated to prevent excessive waste of power in the few inches that separate the arc from the jaws. Copper, of course, is a good conductor, but when it is tarnished by atmospheric gases into copper oxide or copper sulphide it loses its conductivity; the oxide and sulphide of copper are semi-conductors. They are one-way conductors; both copper oxide and copper sulphide have been used exten-

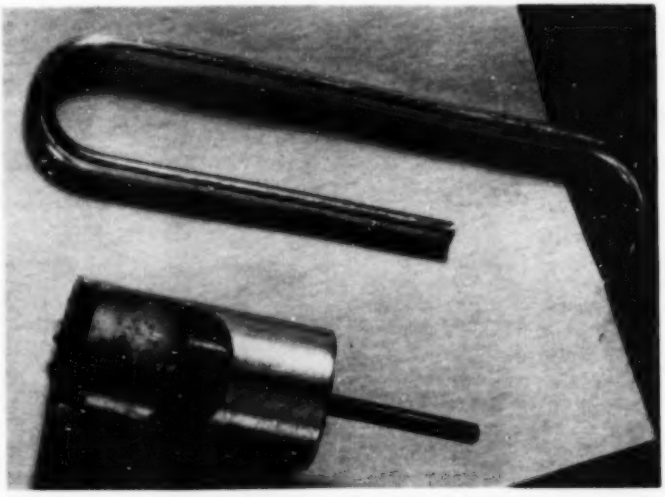

FIG. 2. Phototransistor, an entirely different type of photocell, photographed with a common paper clip to show its size.

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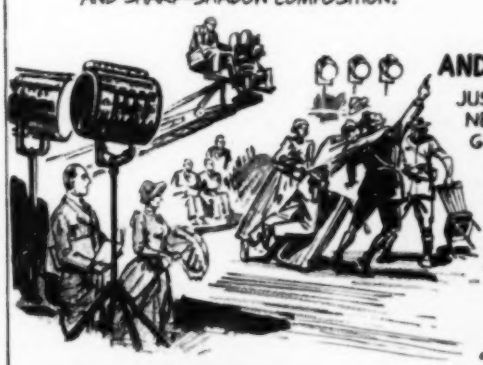

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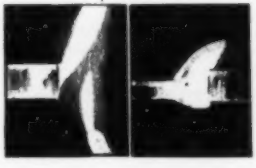

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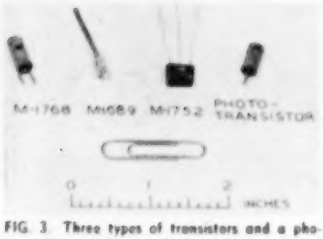


FIG. 3. Three types of transistors and a photransistor, photographed with a common paper clip.

sively in the projection room as rectifiers.

Selenium also is a semi-conductor used as a rectifier in the projection room and elsewhere. In addition to being a rectifier, selenium is light-sensitive; its conductivity varies with its illumination; and the first photocells were selenium photoconductive cells.

Thus the semi-conductors constitute a large and varied family of materials, richly attractive to the curiosity of scientific investigators. Why is a semi-conductor? But for that matter, why is any conductor, and what is an insulator?

Electrical Conductivity

The atoms of solid substances, such as metals, are held together in crystalline lattice or other form by their respective electrons. In some cases, not all the atomic electrons are needed for this purpose; a surplus exists; and this surplus is mobile. All of the best metallic conductors, copper, silver and so on, have one atomic electron each in their outer atomic rings. Apparently the electrons of the inner rings sustain the metallic structure and the single outer-ring electron is free to move through the lattice in response to any electro-motive force that may be applied.

In an insulator there are no surplus electrons, all are needed to bind the atoms together; application of an electromotive force great enough to impose mobility on the bound electrons disrupts the material. In semi-conductors the lattice structure of the atoms may be incomplete in the sense that not all the electrons that should be there are present; "holes" may exist, but not enough of them to cause the structure to fall apart. In other parts of the same semi-conductor there may be a surplus of electrons. An electron may also leave its position in the lattice, drift through the material and pop into an existing "hole" which is then filled while a "hole" remains where the electron used to be. In this sense it can be said that holes move through the material like bubbles through liquid.

It seemed reasonable to the investigators to suppose that the electrons of a semi-conductor could be made to move by application of an electromotive force; for example, a magnetic field. Or, by voltage applied through direct contact. Many experiments were made along these lines. Complications came up; the electrons did not always behave the way calculations said they ought to. But ultimately the experimenters found themselves with a germanium-metal cat-whisker contrivance that they called the transistor and that could amplify and oscillate like a vacuum tube.

Germanium Transistor

Carbon, a semi-conductor, is not a metal. Tin, an excellent conductor, is a metal. In the periodic series of chemical elements germanium is located between carbon and tin.

The first transistor differed in construction from that of Figure 5. In that model the junctions between emitter and base, and between base and collector,

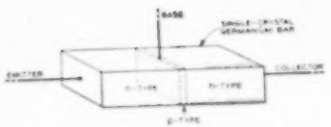


FIG. 5.—Transistor construction: a bar of germanium metal, with three connections. The two ends have been so treated that they contain an excess of electrons beyond the quantity needed to maintain the crystal structure of the metal, and are therefore "n" or negative; the thin center section has been treated to produce a deficiency of electrons there and consequently is "p" or positive. This is an n-p-n junction transistor. There are also p-n-p junction transistors, cats-whisker transistors, and phototransistors.

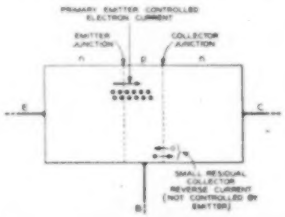


FIG. 6. Functioning of transistor. Electron current flows from left or "emitter" n section through "base" p section to "collector" n section. Extent of electron flow across base or p section is governed by input to p section, much as plate current in an amplifier tube is controlled by input to tube grid. A very much smaller reverse current (as in a copper oxide rectifier) also exists and is shown at the bottom of the drawing.

are broad areas. In the earlier models they were pin-point connections similar to those of the cat-whisker crystal detector of early radio days. Surface effects and contact difficulties complicated the performance of those first transistors, obscured the true action from the investigators, and made it almost impossible to built two that acted alike.

The germanium junction transistor, Figure 5, is stable in performance, and is being produced in quantities within limits of variation no greater than those encountered in manufacturing vacuum tubes.

The action of Figure 5 is diagrammed in Figure 6. It has been compared to that of a vacuum tube, supposing the left section to constitute an emitter and the center section a grid. The right section then corresponds more or less to the plate of a triode. This comparison is carried out in the circuitry of Figure 7 and diagrammed comparatively against the schematic of a vacuum tube in Figure 8.

A signal to be amplified, applied to the

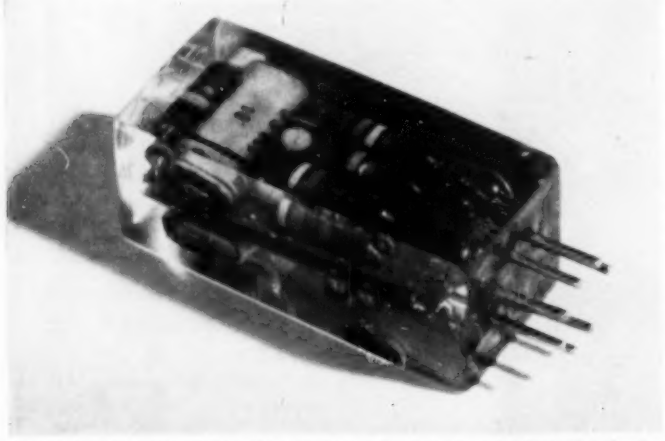


FIG. 4. This is an experimental telephone amplifier. It has transistors instead of tubes, therefore develops substantially no heat in operation. The entire amplifier is embedded in transparent plastic, and in event of trouble is unplugged and replaced as an expendable item.

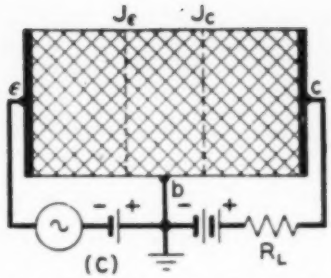


FIG. 7. NPN transistor circuit. Negative potential and signal to be amplified are connected to left or "emitter" section; positive voltage and load to right or collector section. Both circuits, and base section, are grounded.

emitter and base sections of the junction transistor, upsets the electron-hole balance of the material and therefore its conductivity. The stronger current flowing between the collector section and the base is modulated accordingly, and an amplified duplication of the signal thus appears across the load.

In the phototransistor, Figure 2, light falls directly on the germanium metal which responds, selenium-like, by altering its conductivity. The phototransistor is, therefore, a photoconductive cell. It is built as a simple series circuit, not in the triplex arrangement of the amplifying transistor.

Advantages of the Transistor

The prime advantage of the transistor, as compared with the vacuum tube, lies in the fact that the first operates by means of electrons in a solid and the second via electrons in a vacuum. The comparative weakness of the vacuum tube is the method needed to get the electrons into the vacuum. They are gotten there by applying intense heat to a cathode. When the cathode is made hot enough, they boil out. But a tube handling a microwatt signal may need a watt of cathode power. The inefficiency is 1,000,000 to 1.

In the transistor, to the contrary, there is no need to pay the cost of removing electrons from their accustomed abiding place in order to put them to work. They work right where they are, and the only motion imposed on them is that imposed by the input and output signals themselves—*i.e.*, useful motion.

The waste power (sometimes a millionfold waste as just seen) which is involved in putting electrons to work inside a vacuum tube, manifests itself as heat. This heat does much harm to related equipment items unless adequately ventilated. The need for ventilation means that electronic equipment cannot usually be sealed against lubricating oil. (Need for changing tubes also makes hermetic sealing somewhat impractical in common apparatus.)

Further, the tube, not being a solid block of germanium, but an assemblage of elements, is subject to displacement of those elements relatively to each other as a result of mechanical vibration, and hence can become noisy.

The cathode-heating equipment and circuits may also be bulky. In many common amplifiers the heaviest, largest, and perhaps also most expensive, single component may be the filament transformer. Transistors have no filaments.

In the vacuum tube, certain minimum spacings between elements must be provided, according to the voltages applied, to prevent flashover. These spacings limit the possible "miniaturization" of the tube. No corresponding requirements apply to the transistor, which can be made extremely small. Primary considerations governing its size are simply (as in the case of an ordinary wire) the resistivity of the material and the current it is required to carry.

Drawbacks to the transistor, no doubt, will be discovered when it comes into more general use. According to all experience, "bugs" will be found in the field that did not reveal themselves in the laboratory. At the moment, however, the transistor sounds almost too good to be true.

Western Electric Company and RCA, among others, are currently very actively engaged in adapting transistors to working electronic apparatus and vice versa. The telephone amplifier shown in Figure 4 is an experimental model; but IP will print next month a photo of an actual transistor amplifier in commercial use in telephone circuits carrying heavy public traffic.

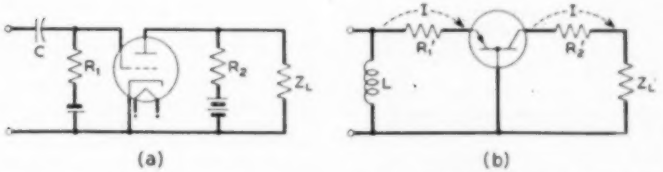


FIG. 8. Conventional amplifier and PNP transistor amplifier schematics compared. Input and output current sources are indicated by the arrowheaded arcs designated, *I*, *I*. Polarities are not the same as in Figure 7 which shows an NPN type transistor.

PERSONAL NOTES

EDWIN L. GRAUEL and A. DEXTER JOHNSON have been named assistant directors of advertising by Eastman Kodak Company. GRAUEL is a graduate of University of Pennsylvania and joined Eastman Kodak in 1930. He is a member of the American Marketing Association, American Statistical Association, Audit Bureau of Circulation, and other important bodies in the advertising field.

JOHNSON, graduate of Brown University, has been with Kodak since 1934, and in charge of the company's impressive colorama exhibit in Grand Central Station, New York, from its inception. He is a director of the Advertising Council of Rochester. W. B. POTTER, director, and L. H. BARTLETT, associate director of advertising, announced the appointments.

JULIUS HABER, whose association with RCA dates from 1922, has been appointed director of public relations for RCA Victor Division. He succeeds JAMES M. TONEY, who has been named director of the consumer products division. HABER started with RCA as an office boy. His most recent post was that of director of advertising and sales promotion activities for RCA Victor Division. C. M. ODORIZZI, operating vice president of the division, announced the changes.

ROBERT C. MCCLELLAND and PHILIP M. CHAMBERLAIN have been named to new posts by THOMAS H. MILLER, manager of Eastman Kodak's photographic training department. MCCLELLAND will be assistant to Miller and will supervise photographic and visual aid services; CHAMBERLAIN is appointed supervisor of group instruction. Both men have been with Eastman Kodak since 1946.

KNUTE PETERSEN, formerly general production manager for Bell & Howell has now become vice president in charge of manufacturing for Radiant Corporation, manufacturers of projection screens and accessories. Petersen has done post graduate work at University of Chicago and Northwestern U.

D. A. ("DAVE") PETERSON, formerly of U. S. Navy, has been appointed Western Division Manager of Altec Service Corporation, succeeding the late Stanley M. Pariseau. Executive vice president H. M. BESSEY announced the appointment.

The Chairman of the Board of Eastman Kodak Company, T. J. HARGRAVE, is currently observing his 25th anniversary with the company.

Free Films in Louisiana

Louisiana Film Catalog Project has compiled a list of films that are available on free loan in that state. The work was done by Louisiana State Library, financed by a grant of $5,000 from the Carnegie Corporation. A total of 855 different titles is included in the catalog. The catalog is being distributed on request to the Library at Baton Rouge.

IN THE
SPOTLIGHT

THE AFL's "Reference Guide for Trade Unions" in the matter of pension plans has now reached this desk. The existence of this guide, which bears the official title "Pension Plans Under Collective Bargaining," was noted herein in October. It is a 114-page, paper-bound pamphlet, sold at 25 cents by the AFL headquarters in Washington. The entire subject of labor union pension plans, what they are, why they exist, how they relate to Social Security, laws concerning them, cost factors, methods of financing, methods of administering, benefit provisions and costs, basic factors in pension negotiations, all are covered in considerable and apparently very expert detail.

A number of typical existing pension plans of AFL unions are listed in an appendix for the guidance of union officials and members; one of these is that of New York Local 306, IATSE.

"A retirement plan," the preface notes, "should be tailor-made to conform to the needs, characteristics, and resources of the particular group of workers which it is to cover. Its structure, its cost, and its value to the members will depend upon factors which vary from one group to the next. It is therefore a mistake simply to take another union's plan and adopt it, in all its details and without modification, as model for an entirely different group of workers."

"The Federal Social Security System," the preface notes in another place, "even after recent improvements, still remains pitifully inadequate. A private pension plan will therefore seem to many to provide a sound and logical solution to the financial problems of the aged. Older members will naturally favor the idea. Younger members who can see far enough ahead to consider the time when they will be in the same boat will also be inclined to approve."

"The union negotiator," explains the first chapter, "should have a clear idea of the fundamental nature of a pension plan—what it can and cannot do, and how it fits in with all the other interests and aims of the union. He should know what the primary objectives of the plan ought to be, how those objectives rank in the order of priority, and how they can best be carried out. He should know what provisions are needed in order to provide the greatest possible degree of protection to the rights of the membership as a whole. This he cannot leave to the outside 'expert'.

"Pensions are a labor cost item, like all of the other economic terms of the working agreement. Viewed solely from this standpoint, it should make little real difference to the employer whether that cost is incurred in the form of contributions to a pension fund, or in the form of higher wages, paid vacations, a health insurance plan, or a reduction in standard working hours.

"A union's ability to negotiate a pension plan will depend largely upon its ability to bring enough argument and pressure to bear to induce the employer to accept a higher labor price. Under ordinary circumstances then, a union that is able to persuade an employer to pay into a pension fund should be just as able to take that economic gain in some form other than pensions if it elected to do so.

"The negotiation of a pension plan therefore involves the sacrifice or deferment of some other alternative objective to which the union could have devoted its collective bargaining energies. In its simplest terms, this presents the union with the question of a choice between current wages and deferred wages — of whether or not it would be wiser to take the cash and let pension credits go.

"Of course, there are other factors which may at one time or another make it easier or more desirable to negotiate a retirement plan than to secure an equivalent increase in cash wages or other benefits. Among these factors may be certain tax advantages for the employer, and precedents in other parts of the trade or in other trades—not to mention the wage stabilization situation.

"Since their effects from the standpoint of inflation are entirely different, as well as for practical administrative reasons, the Wage Stabilization Board has quite properly placed wages and pension plans under separate sets of rules. The Board may accordingly permit the establishment of a pension plan where it would not approve a straight wage increase.

"Under normal conditions, however, most unions must eventually decide whether the interests of the members would be better served by going after a pension plan or by concentrating on the task of improving the wage scale. This is a decision which each union must make for itself, in the light of its own particular circumstances."

Legal regulations and the tax position of pension plans are among other factors the booklet examines in considerably detailed analysis. In the matter of legal restrictions, for example, it points out that:

"The Taft-Hartley Act places certain restrictions upon employer payments to union pension and welfare funds. Section 302 of the Act requires that:

"(1) A written agreement must be made with the employer detailing the basis upon which payments are to be made.

"(2) Employer contributions to union pension and welfare funds must be made to a trust fund, with provision for equal representation by management and labor in the administration of the fund, together with a neutral party or umpire to settle disputes. If the neutral party cannot be agreed upon, he is to be named by the United States district court.

"(3) The agreement must provide for an annual audit, and public posting of the results.

"(4) Pension funds must be kept in a separate trust and used only for pensions or annuities."

We commend this AFL booklet to all Local Unions and their members. If readers so desire, we shall be willing to reprint it serially in these pages.

What is your pleasure in the matter?

• The facilities of the University of Kentucky were made available to the Kentucky Federation of Labor's Department of Research and Education Labor School for its 1953 sessions. This agreement is the culmination of six years negotiations between the University and the Kentucky Federation.

• The dual union situation which plagued IA Baltimore Local 181 for many years is now a thing of the past, and the Motion Picture Projectionists Union of Baltimore City, Inc., which was declared

Thank You, Mr. Kurth!

To the Editor of IP:

Enclosed please find my check for $4.00 for a two-year subscription to your magazine, "*International Projectionist.*" I have found it very interesting and informative.

I am at the present time working part time in Buffalo theatres and am Director of Audio-Visual Education at Le Roy, N. Y.

ALVIN F. KURTH
Le Roy Central Schools
Le Roy, N. Y.

The American Labor Movement

Prepared by the Department of Labor for official use and reference, this history traces labor activity and legislation from Colonial times to today.

Chapter III (Continued). Between Two World Wars

THE National Labor Relations Act (Wagner Act), passed July 5, 1935, guaranteed the right of workers to organize and bargain collectively with their employers. It also prohibited employer-dominated or -financed, company unions.

After the Supreme Court upheld this act in April 1937, organized labor made even greater advances than under the NIRA. By the end of 1937, the teamsters' union reported a membership of 210,000, or three times its 1933 membership; the International Association of Machinists had 138,000 members; the International Brotherhood of Electrical Workers nearly doubled its membership, rising to 171,000; and the Hotel and Restaurant Employees' Union expanded from about 25,000 members in 1933 to 107,000 in 1937.

The Fair Labor Standards Act was a major example of national labor legislation designed to help the worker in the solution of his economic problems. This law, in effect since 1938, sets minimum wage, overtime, and child labor standards which apply to employees engaged in interstate commerce or in the production of goods for interstate commerce. The act received particular support from unions in the textile and apparel industries, both of which contained large low-wage segments, generally in the Southern States, and from the mass-production industries. The 40-cent minimum hourly wage provided by the original act was raised to 75 cents in January 1950.

Progress in membership was accomplished in spite of—or perhaps because of—an internal struggle which developed in the American Federation of Labor, primarily over the industrial versus craft unionism issue. The San Francisco (1934) convention of the AF of L adopted by unanimous vote a report of its resolutions committee which declared that in the mass-production industries new methods had been developed for organizing workers whom it had been "most difficult or impossible to organize into craft unions." The report continued:

> To meet this new condition the Executive Council is directed to issue charters to national and international unions in the automotive, cement, aluminum and such other mass-production and miscellaneous industries as in the judgment of the Executive Council may be necessary to meet the situation.

The resolution also indicated that the jurisdictional rights of existing trade-unions would be recognized. Organizations along craft lines would be retained in those industries where the lines of demarcation between crafts were distinguishable.

Division in the Labor Movement

During the following year the AF of L granted charters to organizations of workers in the automobile and rubber industries. In defining the jurisdiction of these unions the AF of L executive council specifically excluded, however, certain skilled craftsmen and maintenance employees coming under the jurisdiction of other unions.

The industrial or craft organization issue was again brought before the AF of L at its Atlantic City (1935) convention. A minority report of the resolutions committee protested the executive council's interpretation of the San Francisco declaration in industrial unionism and called for "unrestricted charters" to organizations set up in mass-production industries. Defeat of the minority report by a vote of 18,024 to 10,093, after lengthy debate, left the issue unresolved and led to the schism in the labor movement which followed.

Formation of CIO

A few weeks after the 1935 convention, six AF of L affiliated unions and the officers of two other AF of L unions formed a "Committee for Industrial Organization," with the stated purpose to promote organization of the workers in mass-production and unorganized industries and to encourage their affiliation

(*Continued on page 32*)

IN THE SPOTLIGHT

(*Continued from preceding page*)

by the National Labor Relations Board to be a company union controlled by the Motion Picture Theatre Owners of Maryland, has been dissolved. This rump union numbered about 100 members, 30 of whom were obligated into Local 181 at the September meeting. It is expected that the rest of the men will follow suit very shortly.

IA Representative Maynard K. Baird, charter member and former business representative of Local 405, Knoxville, Tenn., was assigned the task of signing up these men for membership in Local 181. His patience and tact in handling this difficult assignment were rewarded when the 30 former dual-union men joined the ranks of the IA Local.

• At the recent Nebraska State Association meeting Alvin Kostlan (Omaha Local 343) was re-elected to the office of president, and Roy Wermer (Lincoln Local 151) was re-elected first vice-president. Kostlan is very active in labor circles in his part of the country and in addition to his official duties as president of Local 343 and of the State Association, he is also an executive board member of the Nebraska Federation of Labor.

• *Recent out-of-town visitors to the offices of IP:* Pat Travers and Larry Lewis, Local 173, Toronto, Ont., Canada; Larry Sabatino, Local 650, Westchester County, N. Y.

• A jurisdictional dispute between Local 306 and the Independent Motion Picture Operators Union, New York City, has resulted in an unfair labor practice action before the N. Y. State Labor Relations Board. The dispute centers around a shuttered neighborhood theatre formerly manned by 306 men, which reopened under new management with members of the Indie outfit in charge of the projection room. Contending that it had prior jurisdiction over the house, Local 306 picketed the theatre until the management discharged the Independent members and hired 306 men.

• Local 558, Dayona Beach, Fla., will hold its 27th anniversary party on the 24th of this month.

• The Southern Labor School held its inauguration last month at Lakeland, Fla. Many prominent Southern labor leaders were present at the sessions and the inauguration was termed as "one of the most constructive and forward-looking developments in the Southern Labor picture."

• IA Local Unions throughout the country have been requested by President Richard F. Walsh to write or wire to U. S. Attorney General James P. McGranery in protest against the Department of Justice's action in the 16-mm anti-trust suit.

• A banquet on Saturday, December 6, will mark the 40th anniversary celebration for Local 488, Harrisburg, Penna. Big doings are planned for that occasion with top IA officials and many prominent civic leaders in attendance.

LETTERS TO THE EDITOR

To the Editor of IP:

Having worked in the craft as a motion picture projectionist for over a decade, I am still very optimistic about the future of our medium, the motion picture theatre, but not always certain that the maximum effort is being exerted by the motion picture projectionist in this era of television, the greatest challenge to the movie industry.

Being a projectionist myself, I want to protest against the many faults passed on to me in so many of the films I receive, and the embarrassment I often feel when I attend a movie. I enter a motion picture theatre as a patron with a little more knowledge of projection than the next person. Is there any excuse for chromatic aberration and loss of light? With most of the marvelous projection equipment now in use, is there any reason whatsoever for blank screens, too high or low voltage, hot spots on the screen, poor changeovers, or out-of-focus pictures?

How can a man miss those splendid 4-frame motor or changeover cue marks? The only reason for punched holes, crayon marks, scratches that resemble billiard balls breaking up, *etc.*, is, in my opinion, due to the laxity of some projectionist down the line who doesn't want to take time out to look for the approaching cues. Regardless of the throw from the lens to the screen, the standard cue marks placed on the frames are sufficient signal to warn the projectionist of the approach.

The man who mutilates the cue marks is making the customer conscious of the fact that an interruption in the picture is forthcoming; such mutilations are observed by the audience, and all the fascination of the images being projected is lost. Try sitting in with the audience some time when you are free, and you will note the distraction caused by "a lit-up Christmas tree."

Cue Mark Mutilation

I am not fortunate enough to work in a first-run house where I can enjoy an "untouched" print. What happens after the print leaves first-run houses and goes down the line? How enjoyable it is to watch a Technicolor print with its "seal cues"; yet in some cases when I get this same print some nice fellow has scratched X'x on the same 4 frames with a sharp blade and put crayon marks on the next 5 frames. This type of dressed up cue mark kicks the fascination of projection technique right out the front door. To me, all science is gone. The art of changing-over is not there and cannot be there so long as the audience sees these mutilations on the screen.

It always gives me a thrill to receive an untouched print. I look back and admire the men who have shown it and take great pleasure in trying to reproduce the past performances of this print. What do you say, boys, give me a break; lay off the cue marks, please! I want the satisfaction of a first-run also. If there are prints that bear poor cue marks —sometimes the exchanges fail to bring out clear ones—the projectionist can make his own with a cue marker, or if this mechanical device is not available, crayon or any other marker that will not be noticeable will serve.

Working without a cue marker my coworker and I sometimes memorize the forthcoming events and make excellent change-overs without the change-over cue mark. When we ship the print out again, we enclose a note to the next user, placing a strip of paper on the reel that is without cue marks.

Torn Sprocket Holes

And why must sprocket holes be torn by poor threading? I claim to have what might be the first Simplex sound projector; every bit of equipment in my projection room is outmoded. Others in the craft are more fortunate than I in being equipped with the latest apparatus. And yet, on those silent-running jobs, how much film is torn by not being properly engaged! I have tried to run a feature in which one reel had the entire sprocket row stripped and sheered because some previous projectionist did not make sure his film was properly engaged.

A basic rule in my projection room is to handle the prints with care. Clean hands, clean machines, no altering of prints, and proper splicing. Who is the man who makes a 100 percent out-of-frame splice? If he goes to the trouble to repair the film at all, why doesn't he make an in-frame splice? We can't expect the next projectionist to carefully examine *every* frame of film.

Many leaders come in spliced out of frame—we try as much as possible to correct this. Certainly if any misframe splices occur after No. 8 on the leader; surely the next projectionist would like to frame up on No. 8 (or any number he uses on his machines), knowing his leader is framed all the way to the picture itself.

I sometimes come upon a theatre beautiful with a most appealing entrance, showing supreme showmanship. But showmanship does not end at the ticket office. We projectionists have to deliver what the marquee promises. Come on, boys, it's Movietime USA. Let's help the industry—which means helping ourselves. To me, motion pictures are and will always be the greatest entertainment medium. To me, smart showmanship begins in the projection room.

When I project a picture, believe me, I am shooting the works. I am selling that picture to the utmost—clear sharp

(*Continued on page 26*)

Laws of Optics Explain Flying Saucers, Scientist Says

DR. I. M. LEVITT, Director of the Fels Planetarium at Franklin Institute, Philadelphia, believes the flying saucers to be "mirages pure and simple" and explains their appearance by the laws of optics. Dr. Fels' views, presented in full in *Popular Mechanics* for September, 1952, are here summarized by permission of that publication.

"Once upon a time," Dr. Fels remarks, "the only place where flying saucers were seen was in the Far West. . . . The lone prospector looked up, saw the momentary appearance of strange lights, and went about his work.

"Today there are hundreds of thousands of persons in the desert regions working for the Atomic Energy Commission and the armed services. Today, the tremendous population in that part of the country has brought to the attention of scientists the fact that there are strange illuminated features in the sky. Make no mistake about it. Something is seen—but that something is not a flying saucer from another world nor is it an airplane from any other country on earth.

The Optics of It

"The features are mirages pure and simple. They are generally associated with hot, dry countries and are most commonly seen over desert regions. As one goes higher and higher in the atmosphere the air gets cooler and cooler, but occasionally there is found a warm layer riding on top of a cold layer of air. . . . As a result, there is found a temperature inversion and the light normally going up and being lost in the sky is bent. Thus light sources from distant cities will be seen against a black

(*Continued on page 25*)

16-mm

BECAUSE EXPANSION OF 16-mm ACTIVITY PROVIDES INCREASING FIELDS OF EMPLOYMENT FOR SKILLED PROFESSIONAL PROJECTIONISTS IN TV STUDIO AND NON-THEATRICAL SHOWINGS, AS WELL AS ENHANCED POSSIBILITIES OF PERSONAL BUSINESS VENTURES, THIS 16-mm DEPARTMENT OF IP WILL APPEAR MONTHLY

DeVry's JAN Magneto-Optical Portable Projector

JAN (Joint Army-Navy) specifications governed the design and performance characteristics of the 16-mm sound projector here pictured, a product of DeVry Corporation. Some 8,000 copies of it are currently in use by the armed forces for instruction and entertainment. The projector is of post-World War II design; magnetic sound facilities were added in 1952.

The equipment consists of three portable units, projector, amplifier and loudspeaker. A portable screen, if used, would constitute a fourth unit. Interconnection is effected by plug-in cables.

Specifications governing the design, construction, performance and durability of this equipment fill a 60-page booklet printed in small type. JAN specs go into detail, relating not only what the equipment must be able to do, but also the exact methods of testing to determine whether it does it. A few excerpts from those specs are submitted here, mostly in the government's original language.

The projector pictured meets these requirements:

Projection Performance

The light output of the projector at rated voltage with shutter running shall be not less than 275 lumens when using new 750-watt lamps . . . or not less than 385 lumens when using new 1,000-watt lamps. . . .

The average illumination at the four corner points shall be not less than 65 percent of the illumination at the center.

Vertical unsteadiness having a period shorter than 1 second shall not exceed 0.2 percent of the picture width in new projectors . . . and shall not exceed 0.3 percent of the picture width in projectors which have been operated for a period of 500 hours. Horizontal unsteadiness having any period whatsoever shall not exceed 0.2 percent of the picture width, either in new projectors or in projectors that have been operated for a period of 500 hours.

No differences in the sharpness of focus of the four corners of the projected image of film passing through the gate of the projector shall be visible from a distance of twice the width of the screen.

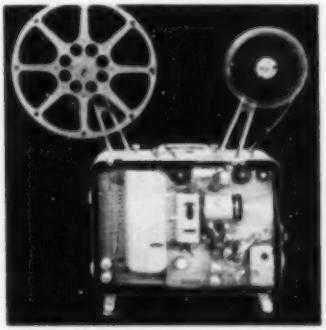


FIG. 1. The projector set up and ready for operation, with film threaded. Cable connections to the other units of the system are not shown in this picture.

Sound Performance

The amplifier shall deliver an output of at least 12 watts with a total harmonic content not exceeding 2.0 percent at any frequencies from 100 to 2,000 cycles, or 4.0 percent at any frequencies from 2,000 to 4,000 cycles.

The over-all noise level of the equipment under normal operation and running without film, as measured electrically at the speaker terminals, shall be not greater than —22 vu (volume units, a unit related to the decibel—Ed. note).

The projector and its associated amplifier shall have a response-frequency characteristic between the dotted limits shown on Figure 3 (flat within 4 db 100-5,000 cycles—Ed. note).

The total rms flutter . . . shall not be greater than 0.35 percent. . . .

Durability

The equipment, packed for carrying, shall be dropped 10 times on a concrete floor from a height of 18 inches (and) except for installed tubes and lamps, shall not be damaged.

The equipment, assembled and ready for operation, shall be rigidly mounted on a vibrating platform . . . this (vibratory) motion shall be applied for a period of two hours. No screws, nuts, bolts, electrical connections, or other parts shall become loose, break or go out of adjustment as the result of such vibration, lamps and electron tubes . . . excluded.

Continuous operation of the projector at rated voltage for 2 hours with the 1,000-watt projection lamp in use shall not produce a temperature rise of any external part of the projector, exclusive of the top cover of the lamphouse, in excess of 50° F. above the ambient.

Continuous operation of the projector at rated voltage for a period of 10 hours with the 1,000-watt projection lamp in use and the ambient temperature at any desired value up to 122° F. shall cause no bulging of the lamp envelope or other damage to the lamp or to the projector due to excessive heating.

Serviceability

The design of the equipment shall be such that, in the replacement of interchangeable parts, no adjustments are required that cannot be performed by a servicemen using standard screwdrivers, wrenches, test films and electrical test instruments customarily available. No tools except common coins shall be required to replace electron tubes, including phototubes; exciter, projection,

FIG. 2. Amplifier panel, showing receptacles for cable plugs, playback volume controls, on-off switch, AC line fuse, filament circuit signal lamp (right of switch), potentiometer shaft for balancing (optical) volumes from two projectors, and input selector switch and jacks.

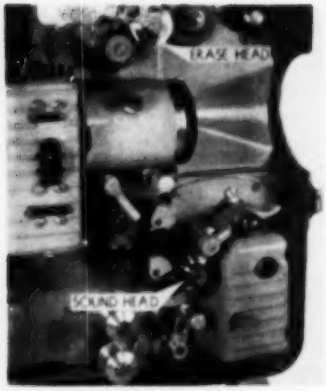


FIG. 3. Operating side of magneto-optical 16-mm projector and magnetic track recorder, with callouts indicating locations of magnetic erase head and magnetic soundhead. Bezel-lamp compartment at lower right contains optical reproducing elements, soundhead roller, just left of this, mounts recording and playback magnetic head.

threading and indicator lamps; and fuses. All belts shall be replaceable without the aid of tools.

Each . . . major subassembly . . . except the projection objective lenses and the sound optical-system lenses, shall provide easy and ready access to its interior parts, terminals and wiring for complete circuit checking and for the removal and replacement of component parts.

The projector shall be so designed that the incandescent lamphouse may be removed and replaced by an arc lamphouse without any necessity for mechanical modification of the projector.

Film Damage

Newly processed and lubricated sound and picture film, in good condition, and having a shrinkage not greater than 0.3 percent, shall exhibit, after 1,000 passages through the projector mechanism with the 750-watt projection lamp burning, no visible evidence of damage in the projected picture and no audible evidence of damage to the soundtrack. . . . The average life of 10 well-made splices . . . shall be not less than 400 passages through the projector mechanism with the 750-watt lamp burning.

With standard reels of from 400- to 2,000-foot capacity, the take-up shall subject the film to a tension of not more than 5 ounces or less than 2 ounces.

Means shall be provided whereby the sprocket will feed film having three adjacent damaged or broken perforations without causing further damage to the film.

The intermittent mechanism shall feed film having two adjacent damaged or broken perforations without causing further damage to the film.

At no point in the path of normal film through the projector, during normal operation, shall the picture area or the sound-track area contact a stationary metal part. All idler rollers and sprockets shall be undercut so as to avoid any contact with picture or sound-track area.

Descriptive Details

Control panel of the amplifier is shown in Figure 2. Circuits follow accepted audio practice with a pentode input stage, three triode stages, a phase-inverter and push-pull pentode output. Inverse feedback is taken from recorder head secondary of the output transformer; this unit has two secondary windings, one for the loudspeaker and one for the magnetic recording head.

Power supply circuits of the amplifier include a pentode, connected as oscillator, to provide 112,000 cycles for the exciter lamp or erase head, as needed. As applied to the lamp filament, this frequency produces no hum that can be heard in the sound; applied to the erase head it is too high to be recorded on the magnetic track but produces a demagnetized or "erased" state in the track, which is then ready to receive new sound.

The panel of the amplifier displays, as can be seen in figure 2, cable connector receptacles for the AC line; for an external changeover device (if used); for two projectors (if more than one is used); microphone and record player (if used) and loudspeaker and recording monitor; and jack connectors for the magnetic head and separate amplifier (if used).

There is an overall gain control, and separate gain controls for bass and treble frequencies; and a coin- or screwdriver-operated "projector balance" that permits matching the (optical) inputs from two projectors (if used) to eliminate any fluctuation of volume at changeover. The three-position switch at right, center, affords choice between optical, microphone or phono input. The output from this switch is opencircuited when the magnetic head output is plugged into the "bridge in" jack.

Additional voltage amplification is required in order to raise the magnetic signal level to that of the lead sulphide photo-resistive cell. This is provided by a two-stage triode pre-amplifier, equipped with its own rectifier tube and DC power supply.

Figure 3 pictures the operating side of the projector mechanism. The erase head is (as indicated) located physically just ahead of the pulldown sprocket. The magnetic head, which serves both for recording and for playback according to switching, is located at the optical sound drum, but cannot be clearly seen in the illustration. It is extremely small, measuring only ¼-inch length x ¼-inch diameter, and concentrating its field force upon an area or gap only 0.0003 inch long. This tiny magnet is mounted on a yoke and is subject to any of six field adjustments, all of which can be accomplished by relatively unskilled personnel: for azimuth, height, lateral position, contact pressure, tracking, and tangentially to the sound drum.

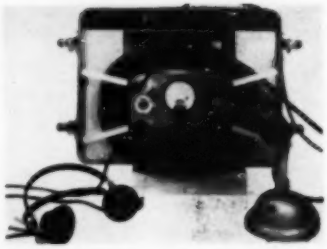


FIG. 4. Magnetic recording accessories, including remotely-located recording monitor panel, mounted in top of speaker cabinet. Both microphone and output lines run through this panel; the volume control in the upper right corner bridges the mike line; other equipment substitutes for the loudspeaker and monitors amplifier output.

Figure 4 shows the remote control recording monitor, as mounted in the top of the speaker carrying case. The microphone line passes through this unit en route from mike to amplifier; the volume control in the upper right corner is a potentiometer bridging the line, by means of which the recorded volume can be adjusted.

The remainder of the equipment in this monitor, including the db meter (which is calibrated to read plus or minus around a position of 0 at the center of the scale) is connected to the amplifier output circuit; *i.e.*, to the speaker winding of the amplifier output transformer.

Since the speaker is not wanted during recording, plugging in the headphones opencircuits it; the headphones and db meter take its place in the circuit. The person controlling the process of magnetic recording then adjusts volume from time to time as desired, guiding himself by the shifting meter indications and by the sound in his headphones. Distraction and faulty judgment resulting from projector noises are minimized by this arrangement, which locates the control instruments and operator at a distance from the projector.

Library Offers a 16-mm Film

A 20-minute black-and-white 16-mm film portraying the services a public library renders to its community has been produced by the Brooklyn Public Library and is offered for sale by the Office of the Editor, Public Library, Grand Army Plaza, Brooklyn, N. Y.

Training Films for Projectionists

PROJECTIONISTS and projection Local Unions interested in studying such subjects as television, the training of apprentices or new members, or in refreshing or extending further the technical backgrounds of older members, may wish to use 16-mm training films now available. The desirability of such films to both experienced and student projectionists is recognized in IA circles. Russell H. Search, secretary of Local 403, Sunbury, Penna., writes to IP as follows:

"It would be a great help to small Locals like ours if a library of 16-mm films on TV, radio and electronics were available through some source such as IP, IA, or RCA. I know some companies have training films which would be of service to IA Locals and think it would be an excellent idea if IP would publish a list of these films and where they can be obtained."

List of Training Films

The list of films that follows, compiled by IP from various catalogues and other sources, is not complete. A complete list might fill most of this issue. It is, however, intended to be representative. Films included touch on the fields of television, optics, lubrication, electronics, sound, mechanics, electricity, and motors and generators.

All are 16-mm sound films in black-and-white unless otherwise noted. A few, as will be seen on the consulting list, are available in color and in 35-mm.

The listing names each film, indicates briefly its scope of coverage, and advises the source from which it can be obtained, the terms, and the running time. Not every mention includes all this information, however, since all of it was not available in every case. Where an omission is found, the reason was lack of complete data in the catalogues consulted. The source, however, is given in every case, and can be consulted directly by readers who wish further information.

Sources are listed in abbreviated form; these abbreviations are translated into full names and addresses in the tabulation of suppliers that follows the film listings.

These films are intended for different training groups, age levels, and educational and technical backgrounds. IP has not reviewed them. Guided by catalogue information, IP has tried to exclude all that are apparently intended for grade school or other very elementary use, and to include (so far as possible) only film texts designed for adult training or at least senior high school and college levels. Some of the texts are elementary; but these are mostly adult armed forces texts created for the instruction of their members, and, therefore, of potential interest and value to student projectionists also.

Terms

Readers should especially note that the terms cited: "free loan"—"rent"—or "sale" may be very flexible. It is entirely possible that a print listed here as available on sale only can be borrowed on free loan from a nearby library or rented at a very nominal charge from a local 16-mm film dealer. Naturally, IP cannot investigate and report the terms on which prints are *locally* available in every part of the United States and Canada. This must remain a matter for individual or Local Union inquiry in each locality. The terms listed here are those specified by the producer or other primary source; and consequently *not* always the only terms on which a given print can be obtained.

TELEVISION

Cathode Ray Tube: Dr. D. W. Coolidge, director of General Electric's research, explains the manufacture and functioning of this basic component of television equipment. General Electric; 6 minutes.

Cathode Ray Tube—How It Works: Construction and functioning of CR tube and all its parts, and how it puts a visible image on its screen. Navy-Castle; sale; 15 minutes.

Magic in the Air: Television camera and receiving tubes, their construction and operation; television studio settings at Radio City, New York; similarity between motion pictures and television. General Motors; 9 minutes.

Radio and Television: Fundamentals of television; wire photo, radio, photoelectric cell, sound. Development of radio. Voca Guidance; 1 reel.

Television Today: All aspects of television—technical, programming and advertising. Columbia Broadcasting System; free loan; 35 minutes.

The "How" of Television: Basic principles of pickup, transmission and reproduction of Tv images in animated presentation. Hammack; 1 reel.

The Magic in Television Tubes: Animated presentation of principles and functioning of Tv tubes. Hammack; 1 reel.

Look for the Inside Story: How a television set works; tuning, controls, antenna, troubles. Westinghouse; free loan; 15 minutes.

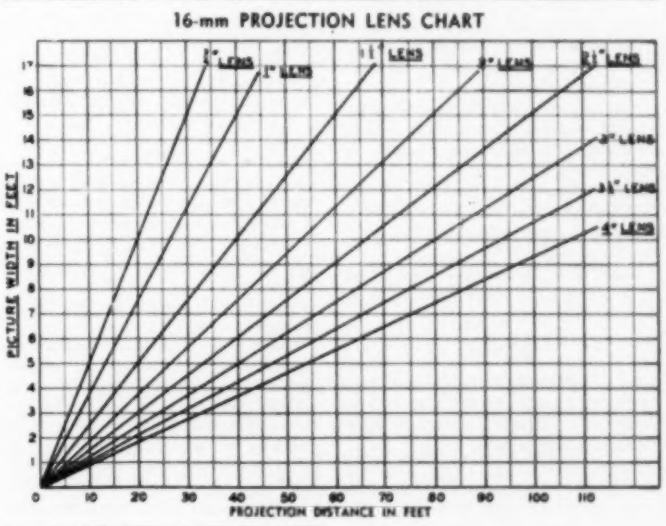
OPTICS

How You See It: Construction of the motion picture projector and optical reasons for lens, shutter and sprockets, in association with phenomenon of persistence of vision. Jam Handy; sale; 10 minutes.

Introduction to Optics: Principles of image formation by lenses; reflection and refraction; light rays and light waves. Navy-Castle; sale; 18 minutes.

Nature of Light: Reflection and refraction. Lenses. American Film, and others, rent; Coronet; sale; 10 minutes. Also available in color.

Light Waves and Their Uses: Reflection and refraction with lenses and mir-



tors. Interferometer, polarization, electromagnetic spectrum and quantum theory. Encyc. Brit.; 10 minutes.

How Motion Pictures Move and Talk: Optical, mechanical and electrical principles behind projection. Persistence of vision. Recording and reproduction of sound. Bell and Howell; rent and sale; 11 minutes.

LUBRICATION

Basic Principles of Lubrication: Functions of lubrication in reducing friction and heat. General Motors; 25 minutes.

Lubrication: Theory of friction and lubrication; types of lubricants to use in different applications. Sinclair; free loan via USBM; 30 minutes.

Principles of Lubrication: Need for and action of lubricants. Viscosity and other properties of lubricants. USOE-Castle; sale; 16 minutes.

ELECTRONICS

Electronics at Work: Basic types of electronic tubes and how they function. Sponsored by Westinghouse; modern; 20 minutes.

Electrons on Parade: Construction and functioning, and common and unusual uses for, electron tubes. RCA; loan; 20 minutes.

Excursions in Science: No. 4. The photoelectric cell and sound motion pictures. General Electric; 10 minutes.

Vacuum Tubes: Animated drawings showing how tubes work as rectifiers, amplifiers and oscillators. Encyc. Brit.; sale; 11 minutes.

Principles of Gas-Filled Tubes: Theory of ionization of gases; action of gas-filled diode as rectifier and of gas-filled triode as grid-triggered rectifier. USOE-Castle; sale; 15 minutes.

Basic Electronics: Instruction in fundamentals. U. S. Air Force; free loan; 17 minutes; color.

The Electron—An Introduction: Nature of electrons, electron flow in solid conductors, etc. USOE-Castle; sale; 17 minutes.

Electronics at Work: Theory and common applications of electronics. Westinghouse; free loan; 20 minutes. Also available on 35-mm.

Engineering—Electronics: Four films, 14 to 24 minutes each. Rent or sale; USOE-Castle.

SOUND

Nature of Sound: Vibrations and transmission of sound, clarified with help of oscilloscope. Coronet; sale; 1 reel; black-and-white or color.

Sound Waves and Their Sources: High-speed camera and oscilloscope with sound accompaniment clarify such details as frequency, amplitude, wavelengths, fundamentals, harmonics and transmission of sound. Encyc. Brit.; sale; 10 minutes.

Vibratory Motions and Waves: Slow motion photography illustrates damped, undamped, propagating and standing waves; transverse and longitudinal waves; wavelength, crest, trough, nodes, antinodes, condensation and rarefaction. Edit PS.; sale; rent; 20 minutes.

Sound: Vibrating objects, wires, violin strings, etc. Recorded by RCA-Victor; Edit PS.; sale; rent; 10 minutes.

Sound Recording and Reproduction: Recording of sound on variable area and variable density motion picture soundtracks, and reproduction from such tracks. Encyc. Brit.; sale; 15 minutes.

The Sounds of Music: Sound frequency, amplitude and quality explained with reference to grooves in phono record. Coronet; sale; 1 reel; black-and-white or color.

Fundamentals of Acoustics: Refraction, reverberation, focusing of sound, attenuation in air, reduction of high and low frequencies; animated action accompanied by sound effects. Encyc. Brit.; sale; 10 minutes.

Wire Sizes and Voltage Drop: Measuring wire sizes, figuring circular mil area, voltage drop, Ohm's Law. USOE-Castle; sale; 13 minutes.

MECHANICS

Principles of Gearing—an Introduction: Friction and toothed gears, laws of gearing, pressure angles, velocity rates, involute profiles, cycloid profiles, circular pitch. USOE-Castle; sale; 18 minutes.

Principles of Dry Friction: Definition, static and kinetic friction, calculations, forces involved. USOE-Castle; sale; 17 minutes.

Simple Machines: Basic principles of wedge, pulley, screw, lever, inclined plane, and their applications in machinery. Animated drawings clarify principles. Encyc. Brit.; sale; 11 minutes.

Transfer of Power: Made in England, produced by Shell. Animated diagrams show principles involved in gearing. BIS; sale; rent; 22 minutes.

ELECTRICITY

Basic Electricity: Elementary principles. USAF; free loan; 20 minutes; color.

Capacitance: Elementary principles. Navy-Castle; sale; 31 minutes.

Coils and Electric Currents: Fields of force in electromagnets, solenoids and electric motors. Edit PS; sale and rent; 13 minutes.

Elementary Electricity — Amperes, Volts and Ohms: Navy-Castle; sale; 8 minutes.

Elementary Electricity — Current and Electromotive Force: Navy-Castle; sale; 10 minutes.

Inductance: Navy-Castle; sale; 35 minutes.

Elementary Electricity — Series and Parallel Circuits: Navy-Castle; sale; 8 minutes.

Principles of Electricity: General Electric; 19 minutes; color.

Electrostatics: Conductors and insula-

Public Aware of Quality in Sound, Audio Fair Shows

THAT the public is becoming increasingly conscious of good quality in sound was abundantly demonstrated at the fourth annual Audio Fair held in the Hotel New Yorker, October 29th-November 1st, in association with the convention of the Audio Engineering Society. Attending it were throngs from all over the United States and a few who by their faces must have come from foreign and very distant lands. On display were highest fidelity amplifiers, record players, record changers, loudspeakers, phono pickups, tape recorders, and disc and tape recordings.

High fidelity sound has become an enormous industry.

People make a fad of it, as of photography. They buy ultra-fidelity recordings; two-way speaker systems, driven by two-way amplifiers and baffled in specially constructed cabinets. They put all that gear in their living rooms to play phono records and radio programs; small fortunes are spent on this activity. They are "nuts on good sound" and expertly critical of audio imperfections. (Will anybody who pays $200 for a living-room loudspeaker baffle respect sloppy reproduction in a theatre?)

Binaural sound attracted exceptional attention—even in that gathering of highest quality audio reproduction the binaural demonstration stood out as superlatively natural. Two loudspeakers at opposite ends of a front wall play the same selection but each plays it as heard by a different microphone—most of the volume of the string instruments comes from the left speaker and most of the brass from the right—the effect is a remarkable simulation of the sound of an actual orchestra.

Briefcase tape recorders are an innovation this year. They are miniaturized magnetic tape mechanisms, battery operated, and intended to be concealed, microphone and all, in an ordinary business briefcase.

Among the dozens of manufacturers exhibiting were: Altec Lansing Corporation, Harvey Radio Company, Reeves Soundcraft Corporation, and Revere Camera Company.

tors, positive and negative charges. Encyc. Brit.; sale; 10 minutes.

Elements of Electrical Circuits: Ohm's Law. Encyc. Brit.; sale.

MOTORS AND GENERATORS

Commutation of DC Machines: Theory and practical maintenance. Westinghouse; 24 minutes; also available on 35-mm.

DC Motor Part I. Mechanical Overhaul: Testing, dismantling, turning commutator, repairing or replacing field coils, reassembling, re-testing. USOE-Castle; sale; 20 minutes.

Repulsion-Induction Motor: General Overhaul: Testing, dismantling, cleaning, replacing bearings, replacing coils, reassembling, lubricating. USOE-Castle; sale; 28 minutes.

Repulsion Motor Principles: Construction and functioning of repulsion motors, effect of brush position; applications of repulsion motors. USOE-Castle; sale; 13 minutes.

Rotating Magnetic Fields: Functioning and construction of polyphase motors. USOE-Castle; sale; 23 minutes.

Single Phase and Polyphase Circuits: Single-, two- and three-phase generators and circuits. USOE-Castle; sale; 17 minutes.

Split-Phase Motor Principles: Stator and rotor construction and wiring, use of capacitor to split single phase. USOE-Castle; sale; 17 minutes.

Squirrel Cage Motor Principles: Fundamental law of induced e.m.f., electron flow in squirrel-cage rotor, resultant torque, construction of such motors. USOE-Castle; sale; 10 minutes.

MISCELLANEOUS

Use and Care of Film Sound Projector: Setting up, threading, operating and maintaining this 16-mm mechanism. Bell & Howell; sale and rent; 20 minutes.

Soldering Lugs and Splicing Stranded Cable: Splicing and soldering light and heavy connections; use of several types of soldering equipment. USOE-Castle; sale; 18 minutes.

SUPPLIERS

The names and addresses of suppliers of 16-mm sound films listed above are appended hereto. It may be worth repeating that these are not necessarily the *only* suppliers for any desired prints or group of prints; that local or nearby 16-mm film libraries may have them and offer them on very varied terms.

Bell & Howell, 711 McCormick Road, Chicago 25, Ill.

British Information Services (BIS), 30 Rockefeller Plaza, New York 20, N. Y.

Castle Films (CASTLE—distributor for USOE), 1445 Park Ave., New York 29, N. Y.

Columbia Broadcasting System, 485 Madison Ave., New York 22, N. Y.

Coronet Films (CORONET), Coronet Bldg., Chicago 1, Ill.

Edited Pictures System (EDIT PS.), 330 West 42 St., New York, N. Y.

Encyclopedia Britannica Films (ENCYC. BRIT.), Wilmette Ave., Wilmette, Ill.

General Electric Co., Visual Instruction Section, 1 River Road, Schenectady, N. Y.

General Motors Corp., 3044 Grand Blvd., Detroit 2, Mich.

Hammack Productions (HAMMACK), 2533 N. Ashland Ave., Chicago, Ill.

Jam Handy Organization (JAM HANDY), 2821 S. Grand Blvd., Detroit 11, Mich.

Modern Talking Picture Service, Inc. (MODERN), 45 Rockefeller Plaza, New York 20, N. Y.

Radio Corporation of America (RCA), Front and Cooper Sts., Camden, N. J.

United States Air Force (USAF), Washington, D. C.

United States Bureau of Mines (USBM), 4800 Forbes St., Pittsburgh, Penna.

United States Office of Education (USOE), Division of Visual Aids, Washington 25, D. C.

Vocational Guidance Films (VOCA GUIDANCE), 2708 Beaver Ave., Des Moines 10, Iowa.

Westinghouse, 306 Fourth Ave., (P. O. Box 1017), Pittsburgh, Penna.

SMPTE Papers of Interest

In accordance with its custom, IP reports to its readers as soon as possible after each semi-annual SMPTE convention the highlights of those technical gatherings from the viewpoint of the practical projectionist. Such report, of the 72nd annual convention, was presented herein in October, page 17, and some of the papers read before the gathering were there reviewed in detail.

A few of the other papers presented before the Convention that will be of interest to projectionists, are abstracted herewith:

NEW PROFESSIONAL TV PROJECTOR

W. E. Stewart

Engineering Products Division, RCA, Camden, N. J.

The RCA Type TP 6A Projector, a new professional projector specifically designed to meet television needs, will be described. The TP 6A features a high-fidelity sound system with fast stabilization time. A 2—3 pulldown system is incorporated especially for television. All gearing runs in oil, and gears and other mechanical parts are designed for long life. Projection lamps change automatically in the event of filament failure. Still pictures can be shown.

DICHROIC MIRRORS AND THEIR LIGHT-DIVIDING CHARACTERISTICS

Mary Ellen Widdop

RCA Victor Division, Camden, N. J.

At present, virtually all lenses are coated to reduce reflection. Plates coated with multilayer films, known as dichroic mirrors, are also being used to efficiently divide light. The recent use of dichroic mirrors in experimental color television equipment is one of the best known applications. This paper reviews briefly the interference phenomenon involved and described the results obtainable with several dichroic mirror designs.

PROJECTOR FOR 16-MM OPTICAL AND MAGNETIC SOUND

John A. Rodgers

Eastman Kodak Co., Rochester, N. Y.

In addition to reproducing sound from conventional optical tracks, this projector is capable of recording and playing back magnetic oxide tracks applied to either single- or double-perforated 16mm films. The important aspects of the mechanical and electrical design are described, showing their relation to the performance of the projector.

SOUND-ON-FILM RECORDING USING ELECTRO-OPTIC CRYSTAL TECHNIQUES

Robert Dressler and Albert Chesnes

Paramount Pictures Corp., New York City

This paper deals with the theoretical and practical aspects of a sound-on-film recorder with no moving parts, utilizing the b-refringence properties of certain crystals. The physical properties of various crystals, as well as final performance measurements of the entire sound system will be discussed.

NOTES ON WEAR OF MAGNETIC HEADS

G. A. Del Valle and L. W. Ferber

RCA Victor Division, Camden, N. J.

Since physical pressure (under contact) is essential between a magnetic head and a magnetic media to provide high-quality sound, it is of extreme importance to determine the operating life of the head. This paper describes the methods used and the results obtained in establishing the wearability of the record-reproduce heads on RCA magnetic projectors.

STANDARDIZATION NEEDS FOR 16-MM MAGNETIC SOUND

E. W. D'Arcy

DeVry Corporation, Chicago, Ill.

Industry requirements for 16mm magnetic sound standards, with a demonstration of the current situation with respect to universal reproducibility of magnetic sound, and an outline of the test film needs for equipment manufacture and maintenance.

FILM PROJECTION USING IMAGE ORTHICON CAMERAS

R. D. Chipp

DuMont Television Network, New York City

Theoretical considerations of the use of image orthicons for film projection have been discussed in the literature. The results of ten months' use of image orthicon cameras for all film transmitted by Television Station WABD, New York, totaling approximately 1700-hr, will be presented. In addition to brief consideration of the technical problems encountered, we will discuss cost, reliability, convenience, and other operational factors.

IA-IP Amateur Radio Bulletins

Contest Prizes Ready

By AMOS KANAGA, W6BAA

Secretary, Local 409, San Mateo, Calif.

THIS IS OFFICIAL—the 1952 IA-IP contest will be extended to January 15 1953. Remember fellows, only IA QSO's in 1952 count in this. The all-time high award for the Brother who has made the most postwar IA-IP contacts will be awarded at the same time. Don't count yourself out gang. A lot of you have come through with the "Worked 10 IA-IP" and the Gold Award "Worked 25 IA-IP"; this definately puts you in the running, so no matter how many IA QSO's you have, send them in, for there are three classifications and all have a fair chance, especially those who have just gotten started this year. Be sure that they are postmarked not later than January 15 1953 and QSO's until that date are OK.

More prizes, you bet. Unfortunately the cuts will not arrive at IP in time to let you see them and drool a bit but Editor A. Nadell (W2URB) promises they will be in the December issue if possible.

Gonset Company sent along some nice ones too, one of their new noise silencers, a new 100% per center indicator, and even a big roll of their special ham ladder line 300 ohm.

San Francisco Radio Supply (near me) through our old friend George Weis has promised a nice prize as well, it's a secret until next month because George ordered it special from the factory for us and wanted to make sure it arrived. Confirmations on some other prizes are in, but the prizes are not here yet, so until they are we would rather not build up to a let-down. This is a promise though, the December issue will have them ALL listed.

As we are getting this copy off here comes the mail man with a letter from that old 16-mm man (put 'em in backwards) Leo Meyerson of World Radio, Council Bluffs, Iowa. Remember last month we told you about his offer of the new B and W Grid dipper? Well, it arrived and just as he hinted in the letter there also were some beautiful cash merchandise orders, two $10 ones and a $5 one good for anything you want. Say, fellows, that's over ten big prizes already! Stop a sec and figure just how much moola those dandy prizes represent, let's be fair too, and give any of these boys whatever business we can.

While one of our prizes is the Rothman kilowatt modulator, W6LYD of Local 401 is using the little Rothman modulater on his mobile and what modulation!

Here and there: W◎GSW Jim Evans of Local 242 is still sending in new IA listings. What we like about Jim is that he sends them along every week or so even if there are only a couple and this makes it a lot easier on us too.

The most asked question we get in the mail and over the air is: "Can you send me a list of the gang?" Well, Brothers, it's this way, IP has time and time again allowed dozens and dozens of extra lists at quite a cost to them. Of course they have been swallowed up, and we just cannot ask them to do this every month, so why not break down and subscribe? You really have to get the copy regularly to keep up on new listings. There is no doubt about it, the list is almost a necessity in the awards and contests. I used to know them all by heart, but no more. I have to refer to it myself; it's just grown too big—wonderful!

Note to you CW men: W6BHV Bill Thompson Local 501, Chico, Calif., is looking for IA-IP CW contacts on 20-40 or 80 and is on every night after 0100 PST. So, OK OK you CW men, send me your calls and Local numbers and what bands and time you are on and we'll fix up a special CW listing for you; and I'll be on it too; send slow! Hi!

It's a pleasant surprise to note how many of the IA gang are CW men only and work hard at it. Personally I work both phone and CW and am ashamed to say that it has been too many years since I pounded brass, it's just like a new world all over again. Try 21 MC it's great (when anyone is on); we hooked a VQ4 with S9 both ways recently on that band. But how could the gang get what they have off of their chests on those midnite QSO's especially on the Coast here with CW? Phone has its merits too.

A few pree-dictions (none accurate) ten is opening this fall. 15 meter band will be FB for fone when the FCC releases it. 75 is really going places right now, we hear 695 and 150 men (IA) in contact with Eastern men almost nightly on 75.

We finally, and accurately, predict that this year's big contest is going to be a wow and not only because of the FB prizes but mostly due to the swell spirit shown by the IA gang.

Note that the IP list fits nicely in your regular log pasted to one page and on the other side plenty of room to paste the additions listed monthly. Cannot promise how soon, but if you don't have the complete list send us your name at once; be sure and include your Local number too.

73.

IA-IP ACHIEVEMENT AWARD BOX SCORE

"Worked 25 IA-IP Gold Award"

W6PFF	Frank Champlain	L. 150
W6MU	A. Houston Barnett	L. 695
W6BAA	Amos Kanaga	L. 409
W6DDQ	Philip Wisdom	L. 695
VE7ALW	Merle Wilson	L. 348
W◎GSW	James Evans	L. 242

* * *

"Worked 10 IA-IP Award"

W4PKT	Marion Sanders	L. 507
W1BVB	Don Fancher	L. 439
W6BAA	Amos Kanaga	L. 409
VE7ALW	Merle Wilson	L. 348
W6FOP	George Abrams	L. 297
W6MU	A. Houston Barnett	L. 695
W6PFF	Frank Champlain	L. 150
W◎GSW	James Evans	L. 242
W◎SJK	C. S. Keay	L. 219
W6LYD	Don Johnson	L. 401
VE3BZJ	L. R. Kilbourne	L. 622

Eastman Personnel Retire

Eastman Kodak Co. announces retirement, after many years of service, of Otto W. Cook, Irving C. Matthews and William H. Zimmer. Cook, 32 years with the company, retired from the post of manager of film manufacturing at the Kodak Park plant. Matthews, veteran of 34 years employment, headed the service section of the chemistry division of the Research Laboratories. Zimmer had been with the organization 41 years, 37 of them in industrial suggestion work, and was regarded as one of the nation's top authorities on industrial suggestion systems.

Nitrate Film Banned in France

All motion pictures imported into France must now be on safety stock, and French laboratories are forbidden to release any new prints except on safety film. The ban on nitrate imports went into effect last month; that on nitrate prints from French laboratories has been in force since June of this year. Non-safety films now in use may continue to circulate but must be replaced by acetate when they wear out. It is expected that in a few years there will no longer be nitrate prints in the country.

May Dub Italian Pics in N. Y.

New York City projectionists may find employment in the not too distant future in a new dubbing studio which Italian Film Export contemplates setting up at an estimated cost of 250 thousand dollars. Currently, Italian-made films shown in the U. S. have their English-language soundtracks (if any) dubbed in Italy.

FLYING SAUCERS

(*Continued from page 18*)

sky. If there is any motion of the air layers, the lights will move across the sky at incredible speeds.

"In newspaper reports which appeared in past weeks there seem to have been a great many of these observations in the East—particularly around Washington, D. C. Why should we see them over Washington when that city is far removed from the desert regions which father mirages? The answer to this question is very likely found in the unbearably hot weather to which we have been subject this summer.

"The advent of the prolonged hot weather simulated desert conditions which gave rise to the mirages appearing over Washington and the eastern seaboard, and the flying saucer scare was on again. . . .

"The problem of their appearance on radar screens has set many people wondering. . . .

"During the last war it was not uncommon for the radar screens to pick up 'twilight ghosts.' Almost every evening, when the sun set, there would appear sharp 'pips' or 'blips' which would last for perhaps 10 minutes. This effect was most pronounced in the tropics, again where there was the maximum possibility for a temperature inversion. There are many effects in radar scanning which cannot be explained.

The Psychology of It

"There is one interesting aspect in the reports on the flying saucers. About 100 years ago the famous Durham Lights appeared over northern England. The century before, 'lights' were seen by the French. Now Americans are seeing weird lights . . . in every case the lights were seen by the people of the leading nation of the world at the time. It may well be that people who have most to lose from a change are the very ones most likely to see mirages.

"Up to this point we have mentioned only the lights which appear at night. Flying saucers have also appeared in the daytime. But in every case the source was found to be a meteorological balloon, a very high flying aircraft, or particles of dust or spiders which float lazily through the air in the general vicinity of the sun. The daytime appearances of these objects have not been a problem —the problem is strictly one of the night lights and these can be explained as mirages.

". . . Why do not the people of the other countries see these objects? With the answer will come an understanding which will remove the fear and hysteria the flying saucers have engendered."

Clear Crisp Pictures with

SUPER SNAPLITE

f/1.9

PROJECTION LENSES

Your patrons will notice the difference! Super Snaplites give you Sharper Pictures, More Illumination, Greater Contrast and Definition.

For the Best in Projection use Super Snaplites . . . the only Projection Lenses to give you a true speed of f/1.9 in every focal length up to 7 inches.

Ask for Bulletins 207 and 209

KOLLMORGEN *Optical* **CORPORATION**

2 Franklin Avenue
Brooklyn 11, New York

"YOU GET MORE LIGHT WITH SUPER SNAPLITE"

16-mm Films in Germany

Post-war Germany is making extensive use of 16-mm films for educational purposes, according to Nathan D. Golden, director of Motion Picture and Photographic Products Division of NPA, who bases his findings on a report received from the US high commissioner for Germany.

Approximately 11,000 schools in Western Germany have 16-mm projectors, and State Film Offices own another 12,500, Golden reveals. These are silent projectors, but State Film Offices also own 260 sound 16-mm projectors which are available to schools.

Some 550 educational 16-mm films are used annually in primary schools and high schools, and about 200 in colleges and universities. Between 50 and 60 educational 16-mm films have been produced since the end of World War II. An exchange program has been established between Germany and private companies in France and Sweden; and between Germany and government agencies in Britain, Netherlands, Switzerland, and Austria, the bulletin issued by the NPA reveals.

Central educational film library in Western Germany is the state-financed and controlled Institute for Film and Pictures in Munich. The Institute serves State Film Offices, which in turn serve 455 county and city film centers throughout the country.

New Rental Film Catalog

A new catalog of 16-mm and 35-mm sound and silent prints available for rent has been issued by the Museum of Modern Art Film Library, 11 West 53rd Street, New York. Titled "Circulating Film Programs," it is a 34-page booklet listing memorable films dating from the primitives of 1895 to modern sound pictures.

Similar series of French, German, Russian, English and Swedish films are also listed; and there are series of comedy, animated and propaganda films. Most of them are available in either 16-mm or 35-mm gauge. The catalog also sets forth the terms on which these films may be rented; they cannot be shown for paid admission but may be presented before paid-membership "film groups" and other institutional audiences.

An earlier Museum of Modern Art catalog, "Documentary and Educational Films," still available, lists an even wider range of materials, also available for "non-commercial" showings only.

Foreigners Modernize, Vallen Finds

Foreign theatre-owners are extensively modernizing their houses, E. J. Vallen, president of Vallen, Inc., reports in a review of his company's business during the first three quarters of 1952. Vallen curtain controls and tracks are currently being bought by theatremen in Caracas, Lima, Manila, Karachi, Mexico City and Chittagong, among others, Vallen reveals. Lima and Caracas sent double orders, for modernization of two different theatres in each of those cities; those at Lima, the Biarritz and the Paris, being reputedly the most luxurious in Latin America.

Chase Troubles with a Hertner

For steady, trouble-free power for arc lamps — *direct current at constant amperes at the proper voltage* — Hertner motor-generator Transverters are supreme. Cool, quiet performance is always assured. Transverters require practically no attention other than casual inspection. Plan now to profit by the experience of thousands of motion picture theatre operators who have been enjoying Hertner Transverter dependability for more than *four decades*. For a complete description of the six types of Hertner Transverters — a model for every requirement — ask for Bulletin No. 301.

TransVerteR
T. M. Reg.

Another New TRANSVERTER
for 50-63 Volt High Intensity and Spot Arcs, for the new type lamps for drive-in theatres. Ask for Bulletin No. 301-A.

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A General Precision Equipment Corporation Subsidiary
REPRESENTATIVES IN PRINCIPAL CITIES
MOTORS . MOTOR GENERATORS . GENERATOR SETS

LETTERS TO THE EDITOR

(*Continued from page* 18)

image, good light, clear sound. Let's get down to business, boys, and *sell* every picture we exhibit. The man down in the front office may wear a nice suit with a flower in the lapel, and the cashier may be the boss's daughter, but we, the men in the projection room, are the whole works in this complex machine. We are the silent showmen, the key to the vast horizons of entertainment; we bring laughter, gayety or sadness to a world of eager eyes. Upon us rests the responsibility of fulfilling what the marquee offers: good clean entertainment—the best show in town, fella—smart showmanship begins in the projection room!

RAYMOND PEQUE
65 Liberty Street
Lodi, N. J.

REEL-END ALARMS
Jackson's Patd. Automatic!
Can't Scratch Film! Foolproof!
Lasts a Lifetime! $18.50 per pair
On Money Back Guarantee
Order one from your dealer or write to
American Theatre Supply Co., Inc.
2300 First Ave., Seattle 1, Wash.

SAFETY FILM: PERFORMANCE CHARACTERISTICS

(Continued from page 7)

Someone is right and someone wrong, or maybe both parties are half right and half wrong. Every projectionist has plenty of reason to squawk at some of the prints we get—yours truly has indulged in plenty of this squawking himself—but haven't bad prints always been with us?

Remember that all of us encountered bicycling of prints, exchange-made splices that readily came apart, torn perforations, bent and roughened edges, *etc.*, long before nitrate got kicked in the pants by high-acetyl. Ask any old-timer what the prints were like in the days when slides were shown between reels. When film breaks are the rule, rather than the exception, that's bad. And film breaks *were* the rule in those days.

Nitrate vs. Safety Stock

To get to the point: Is it true that safety film wears out more quickly than nitrate film? One would naturally think that the answer to this question would be an unequivocal *yes* OR *no*, but if we base our conclusions on this simple premise we shall certainly soon find ourselves tangled up in an intricate web of hopeless contradictions. Better, then, to propose a paradox by saying that the correct answer is *yes* AND *no*, and then see if any intelligent conclusions can be reached by this line of reasoning. The rules of this game demand that we stick to facts. Here are a few:

The projection life of safety stock has been found to compare quite favorably with that of the very best nitrate stock. And even though it is true that the sprocket-holes of safety film fracture more readily than those of nitrate film, *safety prints are seldom junked because of general perforation failure*, unless they have been subjected to some undue mechanical strain which could be equally harmful to nitrate film.

The authority for these sweeping statements is the Eastman Kodak Company. Every other manufacturer of high-acetyl stock will undoubtedly underwrite them. We are, however, free to remain skeptical and probe a little more deeply into the subject. Which is exactly what we intend to do in this article.

Every projectionist who is not a newcomer to the field can recall cases where new nitrate prints had been practically ruined during their first run simply because gate tension was too great and the teeth of the intermittent sprocket, and the holdback sprocket of the sound-head, were hooked, tearing the perforations. Slight fractures at the corners of the perforations, however, did not interfere with picture quality, but longer cracks resulted in an unsteady picture whenever gate tension was excessive. It has been the writer's experience that the perforations of high-acetyl safety film must be very badly fractured indeed in order to produce an unsteady picture when gate tension is normal (12 to 16 ounces).

When the old 0.935-inch diameter intermittent sprockets are used, safety film has approximately 81% of the projection life of nitrate film, when both types of film are run until breakdown of the perforations occurs. The shorter life of the safety film under these conditions is due, not only to its lower tear-strength, but to the greater shrinkage of the nitrate film, giving nitrate the advantage of more nearly fitting the 0.935-inch intermittent sprockets. But with the new 0.940- and 0.943-inch intermittent sprockets, safety film gives a better fit. This increases the projection life of safety film to from 85% to 90% that of nitrate when both films are run to breakdown.

The advantage of the larger 16-tooth intermittent sprockets in increasing film life is not so great as was first supposed. At any rate, the projection life of safety film may, for all practical purposes, be considered to be "about the same" as that of nitrate film, when both films are run over and over again until they break down completely. Needless to say, films are not run to complete breakdown in the theatre.

As far as the *useful* life of a print is concerned—a matter of the utmost practical value to the projectionist—it may be said that there is little if any difference between safety and nitrate prints. After so many runs under average conditions, the safety print suffers from fractured sprocket holes and the nitrate print becomes shrunken and buckled. Of the two evils, slightly checked perforations is without any doubt the lesser.

Most prints are junked because they have played their bookings and are no longer wanted. Everyone has seen the picture; and in the case of the average movie, no one cares to see it again. (Outstanding productions, likely to be reissued, can always be reprinted on fresh stock.)

In most cases a few prints are saved, only the badly worn ones going to the film salvager, the junk man, or the local TV station. Storage would present a tremendous problem if every print of every picture were saved. In the days before 16-mm film, used theatre prints could be bought for home use at prices ranging from 50c to $2.00 per thousand feet. Some exchanges would even give them away just to be rid of them.

Why Prints Are Junked

A print of a picture which is in demand is junked if it becomes so badly damaged that projectionists refuse to run it. In such cases the entire print, or at least the most badly damaged footage, must be replaced by the exchange which farms it out. The causes of film damage have been discussed a number of times in IP, and do not concern us here.

This writer does not hesitate to admit that his most recent experience in projection rooms has been pleasant as regards the general condition of prints. From the time that high-acetyl safety stock came into general use—Eastman abandoned the manufacture of nitrate stock entirely in 1950—subsequent-run prints seem to have fewer and better splices than the subsequent-run prints of nitrate days. There are conspicuous exceptions, of course; but these have always been with us.

(Continued on page 33)

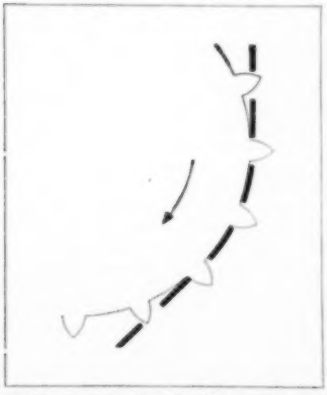

Illustration of excellent fit of older type film having higher shrinkage with a standard 0.935 inch diameter sprocket.

Illustration showing poor fit of present low-shrink film with standard 0.935 inch diameter sprocket. Note interference of top tooth.

TESMA's Huge Equipment Show

MORE than thirty exhibits displaying hundreds of equipment items of direct and immediate interest to projectionists, are scheduled to be shown at the TESMA-TEDA-ASA trade show and simultaneous conventions in Chicago's Morrison Hotel, November 15-19.

Allied States Association of Motion Picture Exhibitors, Theatre Equipment and Supply Manufacturers Association, and Theatre Equipment Dealers Association confidently expect this to be the largest and best attended showing of motion picture theatre equipment and fittings ever staged, since for the first time the three large organizations have united behind a project of this type. There can be few, if any, articles of theatre equipment on the U.S. market that will not be shown or at least represented in Chicago this month.

Top personnel of the most important equipment manufacturing and sales organizations will be on hand to greet visitors and to explain their products. Most companies exhibiting will also provide inquirers with abundant literature setting forth the technical as well as sales-appeal details of the equipment or supplies they offer. A number will offer all comers samples of their merchandise, or souvenirs, or both.

Entertainment features of the joint convention include an open-house cocktail party by National Carbon Company, followed by an all-industry banquet on the evening of November 19; and general hospitality in various hotel suites by a great many of the manufacturers and dealers.

Displays of direct interest to projectionist, their planned booth locations, articles exhibited, and personnel in attendance at each, include the following:

ASHCRAFT MFG. CO. Second Floor, 8 and 9. Arc lamps. Clarence and Mary Ashcraft.

AUTOMATIC DEVICES CO. First Floor, 140. Curtain machines, travelers and controls. A. Samuels.

BALLANTYNE CO. First floor, 124-127. Projector, drive-in amplifiers, in-car speakers. J. Robert Hoff.

BAUSCH & LAMB OPTICAL CO. Second floor, 25. Lenses, condensers, reflectors. M. H. Stevens and others.

CENTURY PROJECTOR CORP. First floor, 10. Projectors and sound equipment. W. D. Hausler and L. W. Davee.

DEVRY CORP. First floor, 119. 35-mm and 16-mm projectors. W. C. DeVry, E. W. D'Arcy and Clare H. Roloff.

GOLDE MFG. CO. Second floor, 52. Rewinds, spotlights. E. M. Goldberg and H. Bob Engel.

COMPOS CORP. Second floor, 60. Rectifier tubes. George B. Marchev.

HAL I. HUFF MFG. CO. Second floor, 76. Carbon water cooler and projection accessories. Hal Huff.

Roy Boomer, Secretary, Theatre Equipment and Supply Manufacturers Association

INTERNATIONAL PROJECTOR CORP. First floor, 78-82. Projection and sound equipment. Arthur E. Meyer.

KOLLMORGEN OPTICAL CO. First floor, 145. Projection lenses. J. A. Fetherston and others.

LAVEZZI MACHINE WORKS. Second floor, 54-55. Projector replacement parts and assemblies. Tom and Bob LaVezzi, and Jake Mitchell.

LORRAINE CARBONS. Second floor, 51. Projection carbons. Ed Lachman and George Walters.

J. E. MCAULEY MFG. CO. First floor 78. Projection arc lamps, 40-200 amperes. Charles A. Hahn.

MOTIOGRAPH, INC. First floor, 109-111. Trad 40-inch lobby television. Fred, Thor and Douglas Matthews, James Huckleberry, Frank Riffle, Jack Behlke, and George and Victor Trad.

NATIONAL CARBON CO. First floor, 146-147. Projection carbons, Everready batteries and flashlights. J. A. McNamee and others.

NATIONAL THEATRE SUPPLY CO. First floor, 78-82. Projectors, arc lamps, drive-in equipment. Walter E. Green, R. L. Bostwick, J. E. Currie, L. C. Ownbey, and J. E. Turnbull.

NEUMADE PRODUCTS CORP. First floor, 14-15. 35-mm and 16-mm rewinds, projection room accessories. Oscar Neu and L. E. Jones.

RADIO CORP. OF AMERICA. Second floor, 5-7. Theatre television, projection and sound equipment. Jack F. O'Brien, Barton Kreuzer, Ralph Heacock, and others.

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J. E. ROBIN, INC. Second floor, 48. Motor-generators.

B. F. SHEARER CO. First floor, 107. Projection screen, projection and sound equipment. T. L. Shearer.

STRONG ELECTRIC CORP. First floor, 150-151. Projection arc lamps, arc slide projector, arc and incandescent spotlights, rectifiers. Harry H. Strong, Arthur Hatch, and others.

WENZEL PROJECTOR CO. Second floor, 45. Projector mechanisms, soundheads, magazines, rewinds. Fred Menzel, C. J. Williams, and others.

THEATRE Tv, STEREO, PROMISE MORE JOBS

(*Continued from page* 10)

ods of achieving the illusion of three-dimensional projection appeared in IP for February, 1952 (page 9) and March 1952 (page 20). Polaroid-spectacle stereo, however, works—provided the patrons are willing to wear the spectacles. Other methods are still in the questionable stage.

In spectacle-stereo two separate images appear on the same screen. They are slightly displaced with respect to each other. The naked eye sees an intolerable blur. The spectacles, however, separate the images and each eye, through its appropriate pola-filter, sees the image intended for it. It is possible to print the two sets of images on the same film, either side by side, or alternating vertically; and where this is done two projectors are used and film threaded normally and no increase in projection staff is required. But light is lost.

To maintain full normal illumination two projectors are used, one for each set of images; four in all to allow for changeovers. Where there are four projectors to be threaded, four lamps to trim, and two prints to inspect, rewind and patch, it is evident that the projection crew must be increased. In fact, the obligations are substantially doubled—in some respects, more than doubled, since the two films running simultaneously must be in absolute synchronism and must be kept identically framed; and this involves a degree of care in threading, patching and monitoring much more exacting than in normal projection. A double-size crew would be in order.

Cinerama

Cinerama in its present form uses four projection rooms. The minimum operating staff therefore consists of six; one man in each projection room, one at the image-control console in the pit and one at the stereosound control console. Regardless of conceivable and as yet unvisioned improvements in technique that might at some future time permit use of a smaller operating staff, heavy demands are imposed by the maintenance requirements of three projectors, three lamphouses, an independent soundhead, three amplifiers and six speaker systems. With all that gear to be cleaned, kept in adjustment, watched during operation, and serviced with such elementary servicing as does not justify calling in a service inspector, Cinerama cannot have a small projection staff.

A four-man shift would seem to be the bedrock minimum within any reasonable future—one to each of three projection rooms (eliminating the fourth room), and one to manipulate a combined picture-and-sound control console assuming that such combination, which now does not exist, is someday achieved; all four men cooperating in overall maintenance. And this would be bed-rock minimum, not a practical working staff with reasonable slack in it to allow for contin-

gencies. As a practical matter, Cinerama no doubt will always require either a five- or more probably a six-man shift.

Stereosound

In its original form stereosound was provided by a triple track on the regular film and a fourth or control track on a separate 35-mm film that was threaded into a separate soundhead. This meant two reels to thread for each changeover instead of one—and, moreover, they had to be threaded in exacting synchronism. A minimum of three amplifier channels and three speaker systems completed the installation.

The added operating function consisted of the threading, rewinding and (when necessary) patching the extra or control film, and assuring its synchronism with the soundtracks it controlled; additional maintenance involved the supervision, cleaning and elementary servicing of three times the normal amplifier and speaker equipment, as well as of an additional soundhead and drive motor.

Resultant manpower requirements would thus seem to call for a third projectionist.

Combination Requirements

If two or more of the above innovations are to be added to the same projection room, the *operating* manpower requirements would be those of the equipment needing the largest number of personnel, since only one of these equipments would be operating at any one time. Thus, if the same theatre had *both* Cinerama and polaroid-spectacle stereoprojection, obviously the six-man Cinerama crew could take ample care of the stereo show which needs only four men.

Maintenance manpower naturally does not follow the same rule, since the more equipment is in the theatre the greater the demands of cleaning, supervision, replenishment, adjustment and elementary maintenance. Thus, a Cinerama-equipped theatre might also have so much additional equipment that six men, although they might be able to operate it all, could not take care of all.

Projectionist Specialization

If experience of allied industries can serve as a guide, the projection craft may possibly stand now on the verge of specialization. Personnel practices in radio broadcasting may serve as an illustration. In the earlier days of that craft, the same man might alternately serve with a field microphone crew, or at the transmitter control board, or in or behind the sound studio. These jobs are all specialized now, at any rate in the larger stations. In such stations, in fact, the transmitter control board may be located many miles away from the studio.

If the projection craft is similarly to specialize under the pressure of so many

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diverse additions to projection room equipment the manpower estimates suggested above may have to be further increased. The fact that there are, for example, six Cinerama-projectionists in a theatre, will not necessarily mean that these men can also work the film-intermediate developer machine. They may not know how. That may be another and different specialty.

Question of the theatre budget, and of its ability to hire all this quantity of diversified and specialized manpower, ties in with the general prosperity level of the nation and does not depend on the theatre industry alone. The commonplace equipment of today's most neglected projection room—motor-driven projectors, automatic-feed arcs, sound amplifiers and the like, would have been economically impossible in the hand-cranked nickelodeon days. Bought second-hand it would have been impossible. In those days the country was not rich enough to pay more than 5 cents per ticket for its entertainment, and a store fitted with undertaker chairs and a bedsheet on the front wall did a fair night's business if it grossed four dollars. How much could that place afford to pay for its equipment, or how many projectionists could it hire?

Who Pays for All This?

Today the American people can afford and pay roughly an average of 50 cents per ticket for entertainment. On Broadway, New York, at this moment of writing, they are happily paying $1.20 to $2.80 for a ticket to Cinerama and standing in long lines for the privilege. How much they are willing to pay for stereo-projection and how many of them are willing to pay it will be tested in Los Angeles and Hollywood this November and reported in these pages in December.

In short, if the public wants it, and is willing and able to buy it, the kind of theatre entertainment that requires three, four or eight projectionists per theatre can be supplied; and that number of jobs per theatre can come into existence. Whether the public wants to buy such entertainment depends on how attractive this industry can make it; whether they are able to buy it depends on the economic condition of the nation.

Gates Resigns from Kodak

Allen B. Gates for 22 years Eastman Kodak Company's expert on management training, has retired. Gates's basic philosophy of management, which he introduced to Eastman Kodak in the early 1930's, still forms a foundation for the company's training program for supervisory and management positions.

World-famous in his field, Gates was American delegate at the 9th International Management Congress in Brussels, last year; and had previously served as delegate to the 7th International Management Congress at Washington in 1938. He is a graduate of Purdue, post-graduate alumnus of University of Illinois, and during the recent war served as consultant to the Office of Production Management, War Manpower Commission, and the Oak Ridge operation of the Atomic Energy Commission. At home he has served as member and president of his local school board, and on several committees of the Rochester Chamber of Commerce.

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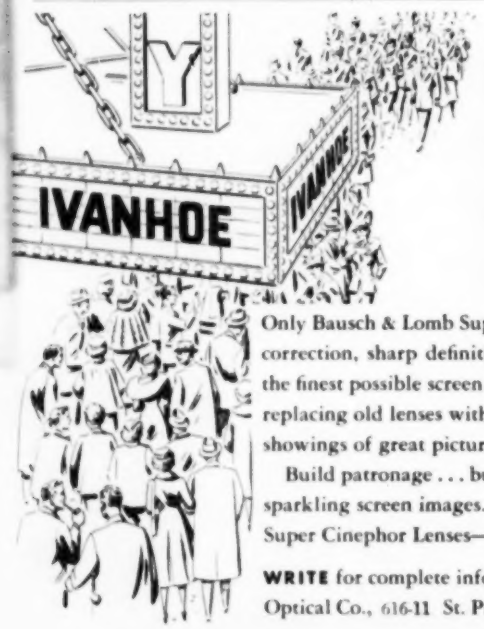

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If sound turns noisy, suspect switch contacts. Manipulate or disturb as many as possible; open and reclose those that can be opened without harm to the show. If increased noise indicates that the faulty contact has been found, jump it (if possible) until a regular replacement can be made.

Those intermittent troubles that obstinately refuse to show up while the service inspector is present sometimes need heroic treatment. If there is a possibility that tubes can be at fault, change all of them. If trouble-free performance then continues indefinitely the old tubes can be put back in service one at a time **only and only at well-spaced intervals,** until return of the trouble indicates which tube was to blame. If changing all tubes at once does not eliminate the difficulty, a similar wholesale replacement (but without discarding the replaced parts) can sometimes be made of all resistors, condensers, etc., in a suspected unit, and these also replaced one by one until the **faulty one is found. Meanwhile, the** show goes on.

Interference with the sound from nearby television or radio broadcasting, or X-ray or diathermy machines, can sometimes be reduced temporarily by disconnecting ground connections of the sound equipment. In addition to a common or master ground at some water-pipe there will be local grounds on individual equipment items, often via connections to electrical conduit or cable. Many of these can be opened, temporarily, to abate the nuisance until more permanent remedies are achieved.

An extension cord of suitable length, such as is sold in dime stores with plug and receptacle at either end, makes a handy emergency gadget in case of power supply trouble. In many projection rooms it can be used successfully to "patch over" equipment to another and operative power circuit until such time as regular repairs can be made.

If standard electricians' rubber and friction tape is not on hand when needed, scotch tape from the manager's office or court plaster from the medical first aid kit will serve temporarily.

Small springs that hold pad rollers, etc., properly closed can sometimes be replaced in emergency by rubber bands suitably positioned. Needless to add, this procedure is definitely not recommended except where there is no other way to save the show!

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AMERICAN LABOR MOVEMENT

(*Continued from page 17*)

with the American Federation of Labor. The committee was later joined by four additional AF of L unions.[1]

The executive council of the AF of L characterized the activities of the Committee for Industrial Organization as "dual" to the AF of L and in January 1936 requested the Committee to disband immediately. The CIO rejected the request. The 10 international unions officially participating in the work of the CIO were suspended from the AF of L by the executive council in September 1936 and this action was upheld by the convention in November of the same year.

The CIO held its first constitutional convention in November 1938. At this convention the Committee for Industrial Organization was reorganized as a federation of national and international unions under the name "Congress of Industrial Organizations." The new federation included 9 of the 10 unions suspended from the AF of L and some 32 other groups or "organizing committees" established to recruit workers in various industries. The International Ladies' Garment Workers' Union did not affiliate with the CIO and returned to the AF of L in 1940.

John L. Lewis, president of the United Mine Workers, was elected to lead the CIO. The constitutional structure of the new organization resembled the AF of L in providing basically for a loose federation of autonomous national unions governed by an executive board composed of a representative from each affiliated union, a board of nine vice presidents, a secretary-treasurer, and president, all elected at annual conventions of delegates from affiliated unions.

Rivalry Promotes Unionization

The difficulties between the AF of L and the CIO did not retard the growth of unionism. In fact, in many ways the rivalry generated by the two large federations stimulated the organizing efforts of the unions in each camp. By the end of 1941, estimated total union membership had climbed to between 10 and 11 million. This was more than double the membership at the time the Committee for Industrial Organization began its campaigns in the large steel, automobile, and textile industries.

With the increased recognition of unions, relations between labor and management gradually improved. The "sit down" strikes which had occurred during the first flush of unionization in some of the mass-production industries subsided. Many unions had won "recognition" and more and more workers were protected by written agreements setting forth their wages, hours, and working conditions.

Despite these gains, which were real and substantial, the number of strikes remained relatively high. In 1941, as prices began inching upward and production and profits rose, stimulated by the war in Europe, stoppages again became more frequent. A few of these controversies were provoked by Communist sympathizers who, before Hitler's attack on Russia in June 1941, favored an "isolationist" policy (after the German invasion of the Soviet Union they became full-fledged "interventionists"). Most of the prewar labor-management conflicts, however, revolved around demands for better wages and greater union security.

[TO BE CONTINUED]

[1] The unions active in the formation of the CIO were: United Mine Workers, represented by John L. Lewis, who was chairman of the organization; Amalgamated Clothing Workers; International Ladies' Garment Workers' Union; United Textile Workers; International Union of Mine, Mill and Smelter Workers; and International Association of Oil Field, Gas Well, and Refinery Workers. Two union officials, Charles P. Howard of the International Typographical Union who became secretary of the committee and Max Zaritsky of the United Hatters, Cap and Millinery Workers, participated as individuals without committing their organizations to the movement. The following four unions joined shortly after the formation of the committee: International Union of United Automobile Workers, United Rubber Workers, Amalgamated Association of Iron, Steel and Tin Workers, and Federation of Flat Glass Workers.

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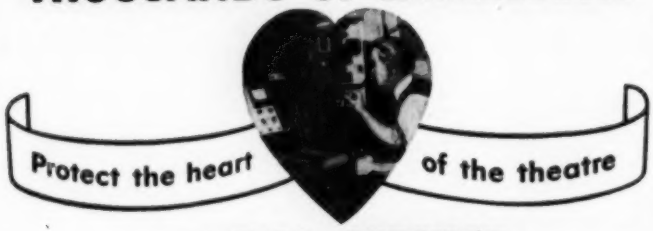

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SAFETY FILM

(Continued from page 27)

Damage to the edges of the film seems to be on the increase, however. Some of this damage is due to uneven rewinding, but most of it can be laid at the door of the distributor who continues to keep bent shipping reels and old-fashioned and battered shipping cases in service. Distributors are prone to blame the projectionist for all film damage, but their accusations seem ridiculous so long as they force the projectionist to extract the reels of film from the cases by the use of hammers, pliers, and the like.

Picture Quality

Many projectionists have asked, "Are the pictures printed on safety film "fuzzier" than those on nitrate film?" The answer is an emphatic *no*. The photographic emulsion is the same no matter what the base, which merely serves as a transparent support for the emulsion.

Because of the general absence of buckling and severe embossing in modern safety film, it should be much easier to maintain a sharp focus on the screen with safety film, especially when powerful lamps are used, than would be possible with nitrate film. There are times when fuzzy processing and printing cause fuzzy images on the film, but that has nothing to do with the safety *versus* nitrate question.

To sum up:

(1.) Safety film is far superior to nitrate film in that it eliminates all fire-hazard.

(2.) Safety film is far superior to nitrate film because safety film is a *permanent* record and can be stored under less exacting conditions.

(3.) Safety film is very much superior to nitrate film as regards shrinkage characteristics and tendency to become brittle.

(4.) Safety film is superior to nitrate film in that it does not readily buckle.

(5.) Safety film is slightly inferior to nitrate film in that it is more sensitive to irregularities of the gate film-runners and pad tension (i.e. it is more difficult to hold flat over the aperture.)

(6.) Safety film is superior to nitrate film in regard to constancy of focus and general resistance to the conditions which induce flutter.

(7.) Safety film is inferior to nitrate film in that it cannot be spliced so rapidly and that the present scarcity of triacetate solvents requires extra care in formulating safety-film cements.

(8.) Safety film is somewhat inferior to nitrate film in tear strength, hence the perforations of safety prints break down before those of nitrate film.

(9.) Because of the superior qualities of safety film in several respects, safety film has approximately the same useful projection life as nitrate film.

(10.) The photographic quality of safety and nitrate film are equally good. But safety film is superior to nitrate in that the photographic emulsion is more stable on safety film. Nitrate base decomposes spontaneously to give off products which cause both unexposed and processed emulsions to deteriorate.

SUMMATION: In general, the inception of high-acetyl safety film marks a distinct advance in motion-picture technology. The new film is in most respects more desirable for theatre-release prints than the old nitrate film.

THE END

More Reel Production Seen Needed

Facilities for production of reels need to be expanded, the Department of Commerce's National Production Authority was advised recently by its Reels and Spools Industry Advisory Committee. The industry manufactures a variety of products ranging from little typewriter ribbon spools to giant 14-foot structural steel reels for heavy cables; but one of its most important customers is the motion picture industry with its heavy consumption of film reels, the NPA was told. Current deliveries are 30 to 45 days late.

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UNDERWRITERS' BULLETIN ON CELLULOSE ACETATE FILM

(Continued from page 7)

portance from the fire and life hazard standpoint. Furthermore, great volumes of explosive and toxic gases are given off from decomposition of nitrate film, especially in a restricted supply of air, thus contributing to the life and fire hazard.

The rate of combustion of cellulose acetate film is relatively slow and the amount of heat evolved is of a low order, being much less than that of paper or wood.

The most important safety factor with reference to cellulose acetate film, is in its slow combustion, and any fire can be easily extinguished by the application of water or smothering, much in the same manner as fires in ordinary combustible materials.

Precautions Still Needed

The time will, no doubt, come when nearly all pictures will be on safety film, but there may be nitrate films in circulation for some time and because of this every precaution should be taken to avoid any relaxation in the regulations prescribed and methods imposed for the safe handling of flammable nitrate films.

The safety factor supplied by the new acetate film can be taken advantage of by arranging its storage apart from any nitrate films. By this segregation, loss possibilities will definitely be reduced, and as nitrate inventories are progressively diminished their isolated confinement will tend to further control hazard possibilities.

In existing film exchanges, this segregation can be readily controlled by having separate film vaults for safety and nitrate films, and marking their doors with the words Safety Film in *green*, or Nitrate Film in *red*.

Similar isolation of safety films from nitrate films can also be practiced using specially identified rooms for the safety film with such measures for protection against loss as may be desired. Small amounts of safety film can be appropriately stored in ordinary steel filing cases but if they are of high value specially protected cabinets of the type designed for film storage should be given consideration.

In order to insure the degree of safety now provided by the new film, it is suggested that all safety films be unmistakably identified by reel bands bearing in prominent letters the words, SAFETY FILM printed in bright green. All record cards and other control items that pertain to these films should also be printed in the same green color and bear as their main feature the words SAFETY FILM. In contrast, all flammable nitrate films should be equipped with reel bands printed in bright red with the words NITRATE FILM, with their record items correspondingly identified.

Film handling personnel working under this plan for segregating the two types of film should take special care to prevent intermixture of the two types, and there should be exacting supervision of storage facilities to minimize all possible loss. By positive and intelligent management the safety factor provided by this new film base can immediately benefit all engaged in motion picture film activities.

If such a plan for careful segregation is not followed, any place where both types of film are handled should follow for all film the safety precautions prescribed for nitrate film.

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Business Manager: R. A. ENTRACHT, 19 West 44 Street, New York 36, N. Y.

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Now E Bonds earn more! 1) All Series E Bonds bought after May 1, 1952 average 3% interest, compounded semiannually! Interest now starts after 6 months and is higher in the early years. 2) *All maturing E Bonds* automatically go on earning *after maturity*—and at the new higher interest! Today, start investing in better-paying United States Series E Defense Bonds through the Payroll Savings Plan where you work or the Bond-A-Month Plan where you bank!

Peace is for the strong!
For peace and prosperity save with U.S. Defense Bonds!

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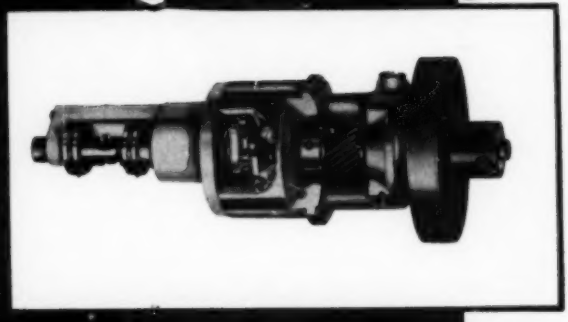

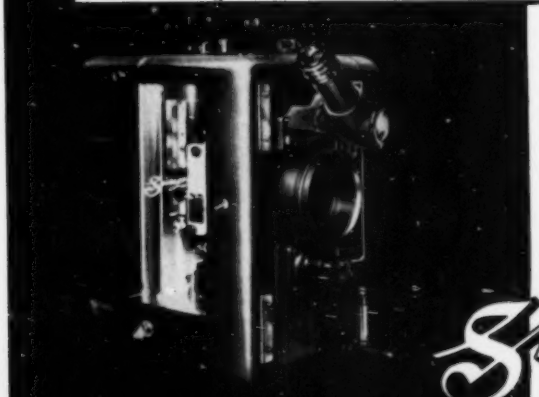

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